00:00:00.000 --> 00:00:07.980  
Grant Sutherland  
Cheer for around 10 to 15 minutes. And as I say, if we have time we can look at some some some Q&A time.

00:00:08.710 --> 00:00:10.240  
Grant Sutherland  
So the first week it's right.

00:00:10.520 --> 00:00:14.820  
Lyn M Moore (DJPR)  
Sorry, could I just interrupt and just? Uh, could you just let everyone know that we are recording?

00:00:16.040 --> 00:00:16.600  
Lyn M Moore (DJPR)  
Just.

00:00:16.420 --> 00:00:26.590  
Grant Sutherland  
OK, so just to let everyone know that we are recording. Hopefully we didn't start with Steven and Lisas exchange, so hopefully that wasn't the record button was pressed at that stage.

00:00:27.960 --> 00:00:34.190  
Grant Sutherland  
But if anyone has any concerns around that, let us know and.

00:00:35.690 --> 00:00:46.240  
Grant Sutherland  
Will act on that. So as I said, the first speaker today is Gabriel Henry, who was the director. Industry engagement development from apartment environment, land, water and planning.

00:00:47.090 --> 00:00:54.430  
Grant Sutherland  
So Gabriel, thank you very much for making yourself available to talk to us today Ann. Welcome and I'll hand over to you.

00:00:55.860 --> 00:01:15.800  
Gabrielle L Henry (DELWP)  
Thanks so much Brandon. Thanks for the invitation to be here today. I'm really thrilled and I'm really looking forward to talking you through some of the activities we've been undertaking. Now I believe my colleague deeper is just putting up my presentation. Thank you deeper and just to introduce you.

00:01:16.290 --> 00:01:50.460  
Gabrielle L Henry (DELWP)  
Up to what Victorian government has been doing in planning for a renewable hydrogen economy. So as per the introduction on Director of industry engagement and development within the Energy Group at Delp, and that gives me a remit over emerging energy technologies, including hydrogen and also the digitalization of the energy sector and business and industry engagement. And we'll eat at work program focused on commercial and pre commercial energy opportunities looking at.

00:01:50.520 --> 00:02:09.390  
Gabrielle L Henry (DELWP)  
An energy market failure, failures and opportunities and focusing on GNU energy business and sector development. I'd also like to start by acknowledging the traditional owners of the land on which I join you from an I pay my respects to elders past present, an emerging next slide, thanks.

00:02:10.190 --> 00:02:41.720  
Gabrielle L Henry (DELWP)  
So I'd like to start digging straight into the technical detail with an introduction to renewable hydrogen. Hydrogen can be produced in several ways, including from water is the key feedstock, and this requires energy through a process known as electrolysis, an that uses electricity to just simply strip split water into its component atoms. So when hydrogen is generated using entirely renewable sources, there are no carbon emissions an it's referred to as renewable hydrogen.

00:02:42.250 --> 00:03:16.320  
Gabrielle L Henry (DELWP)  
Can also be called green hydrogen. You might have heard that bandied around the traps too, so renewable hydrogen is a safe and established technology, but there are some barriers to widespread uptake. It's currently expensive to generate and therefore it's not commercially viable at this point in time for many businesses, but we expect that hydrogen technologies will become more competitive as the sector grows. Some of the other barriers related to infrastructure and transport. Hydrogen is a tiny little molecule that can escape from pipes and tanks that are designed to transport natural gas.

00:03:16.540 --> 00:03:26.730  
Gabrielle L Henry (DELWP)  
It's also difficult to transport large amounts of hydrogen without compressing, liquefying, or converting it, and this requires energy, which also adds cost.

00:03:27.740 --> 00:03:39.460  
Gabrielle L Henry (DELWP)  
So the Victorian Government, like many organisations globally, is supporting research into various areas of renewable hydrogen technology and this could help to address some of these challenges. So next slide.

00:03:41.340 --> 00:04:00.650  
Gabrielle L Henry (DELWP)  
So why is hydrogen important? It offers enormous potential as a clean and reliable alternative to natural gas as a transport, fuel, and for industries that will be unable or difficult to electrify. And this is particular opportunity for Victoria that is heavily reliant on natural gas.

00:04:01.230 --> 00:04:31.270  
Gabrielle L Henry (DELWP)  
A man has many industries that use it for sort of energy heater as a feedstock, so hydrogens properties, including its high flying temperature and efficiency as a long distance. You'll make it well suited to various applications across our economy and its potential is exciting because all the elements of the generation process is already already exist. It's an established technology, we've got plentiful renewable energy and therefore the ability to generate large volumes of hydrogen gas with no emissions.

00:04:31.320 --> 00:04:32.330  
Gabrielle L Henry (DELWP)  
Next line, thanks.

00:04:34.110 --> 00:05:06.540  
Gabrielle L Henry (DELWP)  
So 100 and offers significant potential is a transport fuel and can be used for long haul freight buses or cars and we're seeing some of the early stages that industry is leaning towards some of the larger vehicles as being most cost competitive in the initial stages. Hydrogen can be used for industries that can use it as a feedstock and it can also be used within a manufacturing in high heat processes such as those that currently use natural gas or in agriculture as a replacement for diesel fuel.

00:05:07.220 --> 00:05:34.400  
Gabrielle L Henry (DELWP)  
It's also been considered as a substitute for natural gas for domestic use through our round reticulated gas network and studies and trials are currently being developed today to blend 10% hydrogen in the natural gas network, with a view to increasing this percentage over time. So these are just sort of looking at what some of the barriers might be. Sort of some of the things that we might do need to do about legislative and regulatory change and safety and standards and so on.

00:05:35.280 --> 00:06:10.240  
Gabrielle L Henry (DELWP)  
Hydrogen offers significant potential as an energy storage solution to and you can convert hydrogen into electricity when it's needed, and it can be stored for extended period of times and a time, and that's not a seasonal storage. There's also real opportunities in the export market with strong import signals from international markets such as Japan, South Korea, and Germany for renewable hydrogen next slide. Thanks, renewable hydrogen has emerged as a valuable tool for both economic growth and decarbonization an it's likely to be an important way for to help us create a clean hit.

00:06:10.540 --> 00:06:11.760  
Gabrielle L Henry (DELWP)  
Clean energy future.

00:06:12.670 --> 00:06:24.810  
Gabrielle L Henry (DELWP)  
And this diagram does show some of the ways that it can be generated and used, so this transition is well underway as we move towards our legislated targets or 50%.

00:06:26.120 --> 00:06:32.660  
Gabrielle L Henry (DELWP)  
Renewable energy by 2030 an with the target to reach net zero emissions by 2050 years. Well, next slide.

00:06:33.880 --> 00:06:58.630  
Gabrielle L Henry (DELWP)  
So why Victoria? I sort of touched on it briefly before, but Victoria has many advantages in developing a thriving renewable hydrogen economy, and that's due to our extensive gas networks are highly skilled gas workforce renewable energy resources, world class education and research institutions, connected transport networks, an export ready infrastructure amongst other things.

00:06:59.250 --> 00:07:22.270  
Gabrielle L Henry (DELWP)  
So accelerating the demand of our renewable hydrogen industry will play a critical role in reshaping our state's economy. As we recover from the pandemic, and this is especially important given that there's a forecast of over seven and a half thousand jobs that could Creek be created nationally by the emerging hydrogen economy, and that could add around $11 billion annually to our nation's economy. Next slide, thanks.

00:07:23.530 --> 00:07:57.320  
Gabrielle L Henry (DELWP)  
Sorry, our Victorian renewable hydrogen industry development plan that was released earlier this year that my hydrogen team developed outlines our states key focus areas and actions to accelerate the development of a renewable hydrogen industry across the state. The plan identifies the areas where government will take a leadership role to create long term jobs and new career pathways and stick IT skills. Clusters build our skills and capacity and renewable hydrogen drive innovation and reduce greenhouse gas emissions across our industrial energy and transport.

00:07:58.070 --> 00:07:59.070  
Gabrielle L Henry (DELWP)  
Next slide, thanks.

00:08:00.560 --> 00:08:34.340  
Gabrielle L Henry (DELWP)  
So we've already laid the foundations in sort of setting out our vision in the plan, and now we're ready to take this first steps, and that includes pilots, researched feasibility studies, investment attraction, building supply chain capabilities commencing legislative and regulatory changes, and building workforce capabilities, skills, and training opportunities. We want to see the sector grow and strengthen to see new skills and technologies tested and expanded, and connections made between the physical infrastructure skills and energy resources.

00:08:34.390 --> 00:08:37.230  
Gabrielle L Henry (DELWP)  
And eventually achieve a thriving hydrogen economy.

00:08:38.320 --> 00:08:39.560  
Gabrielle L Henry (DELWP)  
Next, slide things.

00:08:43.710 --> 00:09:09.400  
Gabrielle L Henry (DELWP)  
And I did just seem too. I noted Terry saying his size don't seem to be updating. I know that there's sometimes with these quirks with these platforms that there can be might be a version issue. You might need to sort of jump out of teams and jump back in. There's a few ways of trying to address it. I do apologize if there's some of you that are unable to see, but hopefully uncovering verbally. At least what people are seeing on the screen.

00:09:10.800 --> 00:09:41.150  
Gabrielle L Henry (DELWP)  
So I complementing our plan, we are also supporting several key initiatives as a first step towards establishing a hydrogen economy, and we've recently announced renewable hydrogen. Glad grants that include the renewable hydrogen Commercialization Pathways Fund and this is $6.2 million to support renewable hydrogen, trump pilots trials and demonstrations, and also the renewable hydrogen Business Ready Fund. And that's $1,000,000 to enable business cases and feasibility studies for businesses too.

00:09:41.620 --> 00:09:54.460  
Gabrielle L Henry (DELWP)  
See how they can transition to using renewable hydrogen so these grants are now open for another week yet, and you can find out more by going to our website and I'll provide a link at the end of the presentation.

00:09:55.350 --> 00:10:25.060  
Gabrielle L Henry (DELWP)  
We've also, as a state, provided $10 million for the first international hydrogen development partnership with Swinburne University, the CSIRO in Germany's Arena, 2620 thirty six, and that's known as the Victorian Hydrogen Hub or VH two, and we've also provided $9 million to establish our high sell at deacons. Wonderful campus, and you'll hear more about that. I think today other initiatives include $500,000 in funding to establish the Australian Hydrogen Center.

00:10:25.260 --> 00:10:45.390  
Gabrielle L Henry (DELWP)  
And we're a founding member there and that's looking at the feasibility studies for hydrogen gas blending in our natural gas networks. We've also sponsored the CSI rose hydrogen studies and with the Victorian Parliament of Transport has currently has a $20 million zero missions bus trial. Next slide, thanks.

00:10:47.230 --> 00:11:19.770  
Gabrielle L Henry (DELWP)  
So all Victorian regions have a role to play in establish our states hydrogen economy and we want to support collaboration across the entire hydrogen support supply chain, and that's why we're Co funding. The National Energy Resource Australia, and that's nearer their heart. Regional hydrogen technology clusters in Victoria, and that includes support for four clusters across Victoria in Greater Geelong. Gippsland Clayton Anomali regions, Anna statewide Victorian cluster network and I think you're going to be hearing from.

00:11:19.820 --> 00:11:21.410  
Gabrielle L Henry (DELWP)  
Also a bit more about that soon too.

00:11:22.570 --> 00:11:40.400  
Gabrielle L Henry (DELWP)  
And unlike other states are high density population density in statewide infrastructure means we're leveraging existing frameworks rather than having to create new ones. And we need all our regions activated to make Victoria Global player and make sure Australia is seen as an attractive location to invest next slide, thanks.

00:11:41.430 --> 00:12:11.390  
Gabrielle L Henry (DELWP)  
So the Barwon Southwest region has many of the elements needed to establish a thriving, renewable hydrogen economy to Long Warner Bouillon. Portlander agricultural hubs Portland, and along both had deep water ports, and there are plentiful renewable energy resources and many manufacturing businesses which will need to find ways to decarbonize as we move towards. Net zero emissions by 2050. So as you can see, we see the bar in Southwest region as an exciting potential focus of renewable hydrogen development.

00:12:11.440 --> 00:12:14.930  
Gabrielle L Henry (DELWP)  
In the coming years. So next and final side thanks.

00:12:16.900 --> 00:12:44.280  
Gabrielle L Henry (DELWP)  
So thanks for your time and attention today. I hope you found the presentation informative and we look forward to working closely with organisations such as high cell and the greater Geelong, Regional hydrogen technology cluster, other businesses and stakeholders in the region. As we continue to develop renewable hydrogen technologies and opportunities. So thank you and please don't hesitate to get in touch if you'd like any further information.

00:12:45.470 --> 00:12:47.610  
Grant Sutherland  
So thank you very much. Gabriel, that's.

00:12:48.600 --> 00:13:02.810  
Grant Sutherland  
In a short time, you've covered. Really great summary. There of all the policy and the funding programs, which is exciting that are available at the moment and I guess being parochial is great to hear. Barn Southwest is in is a region that.

00:13:02.900 --> 00:13:29.870  
Grant Sutherland  
Some other state government says is actually a particular focus on potential, so thank you very much for that will now move on to our second speaker or concerns right in the middle of my screen so welcome apps. Alpha Blia is program director of the Greater Geelong Hodges and technology cluster and understand that was launched earlier this year so overdue apps to talk through that.

00:13:30.490 --> 00:13:35.480  
Abs Bulbuliya  
So thank you, grant, I'll, I'll try and share my screen. See how we go with that one.

00:13:41.130 --> 00:13:46.980  
Abs Bulbuliya  
Hopefully everyone can see a bunch of slides. Is that someone give me a thumbs up or yes.

00:13:46.820 --> 00:13:48.480  
Lyn M Moore (DJPR)  
Yeah, that's good, I can say.

00:13:48.460 --> 00:13:48.960  
Abs Bulbuliya  
Excellent.

00:13:48.610 --> 00:13:50.020  
Grant Sutherland  
Yeah oh good thanks at.

00:13:51.260 --> 00:13:58.520  
Abs Bulbuliya  
So before I start, let me acknowledge the land of the people I'm on and pay my respects to the leaders past, present and emerging.

00:14:00.100 --> 00:14:13.410  
Abs Bulbuliya  
Thank you Grant on the team for for giving me this opportunity at a platform to talk about the grated you long hygiene cluster. As Gabriel mentioned, this is part of some of the work that Delta doing as well. I'll cover covered off shortly.

00:14:15.410 --> 00:14:39.240  
Abs Bulbuliya  
Just to give a bit of background, so I'm a bully. I'm the energy program director at Startup Boot Camp and I'm the director for the hygiene cluster in that equation. Long region. So the hygiene technology cluster Australia is a National Network Co funded by nearer on the national stage and nearer and Delp on the Victorian statewide level.

00:14:39.950 --> 00:15:00.850  
Abs Bulbuliya  
And there's 15 clusters all in regional parts of Australia. Four of those are in Victoria. We've got four in in WA and we can see each and every other state intelligence covered as well. This is a national network where there's a whole number of collaboration between the clusters are both within the state and also nationally as well.

00:15:03.000 --> 00:15:32.970  
Abs Bulbuliya  
So in this one, the big questions I get asked next is what is a cluster on a show? You've got nothing to do with kovid, So what we are is a is an organization that really brings together a number of entities. So one is entrepreneurs and startups. We have large corporations, more medium enterprises, universities, investors, governments, international hygiene sector and the Community itself, all coalescing around a certain theme. And the theme in this.

00:15:33.020 --> 00:15:34.320  
Abs Bulbuliya  
Instances hydrogen.

00:15:35.170 --> 00:15:51.960  
Abs Bulbuliya  
And our job is to really connect all these entities together to build better innovation systems through education, training, coaching and mentoring. And to really advance and accelerate the hygiene economy in the greater Geelong Unbound Southwest region do really become this engine for economic growth.

00:15:53.970 --> 00:16:22.000  
Abs Bulbuliya  
So what is the Geelong cluster capacity is pretty much everything westbound from Melbourne to that great Geelong region. Unbound southwest as well including one in Berlin, Portland, so what's the current map of the greater Geelong cluster? As you can see there's a whole number of large industrial organizations as universities. There is a small medium enterprises government as well, all coalescing around this hydrogen and green hygiene opportunity that we've seen in the region.

00:16:23.290 --> 00:16:54.880  
Abs Bulbuliya  
One of the big things that we date as a cluster was being bring these entities together and when the number of workshops around where do we see the key advantages of the region and Gabriel covered? A few of those in her presentation earlier? So what we found from these consultations is the region has a number of really great ingredients to be a real leader in the hydrogen economy in Australia, so the way region is a major hub for some really hard to decarbonize or harder to decarbonize sectors.

00:16:54.960 --> 00:17:25.620  
Abs Bulbuliya  
On such as manufacturing, agriculture, energy and transportation, there's two deepwater ports and Geelong in Portland. There's multiple leading education institutions in the region, and you're going to hear from Deacon them. After my optime, there's really highly skilled workforce with real skills are adjacent to the industries in hygiene, especially in the gas sector. There's a really extensive gas mains network. There's water resources, and there's a major renewable energy zone in the in the portal region as well.

00:17:25.700 --> 00:17:35.060  
Abs Bulbuliya  
And most importantly, what we did find was there's a collective will from all the classes, supports to actually advance the hygiene economy in the region.

00:17:37.000 --> 00:18:00.220  
Abs Bulbuliya  
So what we've done as a cluster is we've seen where the hydrogen economy is, whether it's upstream in the production side, in the transportation and storage side of hydrogen, or in the in the use cases. So the demand side of hygiene, and we've really positioned the cluster around the demand side and the use cases of hydrogen. And how do we really stimulate stimulate the demand?

00:18:00.910 --> 00:18:15.140  
Abs Bulbuliya  
And especially focusing on the hard to decarbonize sectors such as the manufacturing, agriculture, transportation and energy there, other cluster, we're really focusing on the commercialization of hydrogen and former background as started boot camp. We have a real.

00:18:15.230 --> 00:18:36.920  
Abs Bulbuliya  
And visibility of innovation technology that's happening on the global scale. And we want to bring that as well into the region. And this is a pretty pretty busy slide and I'm sure I'll share the slides with with the participants afterwards. But as a cluster, we're really focusing on the three things that you see in the middle, so projects. So how do we identify projects in the region?

00:18:37.750 --> 00:18:54.020  
Abs Bulbuliya  
And bring them to the surface education and upskilling as well as international linkages. How do you connect the region up to to these hygiene centers and hubs around the world and create this network of innovation technology that we can share globally?

00:18:56.240 --> 00:19:26.020  
Abs Bulbuliya  
So in order to commercialize hydrogen, what we've done within our cluster is built. A model called the Cooperative Commercialization Center, and it's really focused on on the demand side and bringing the best ideas and opportunities in hygiene and creating this coalition of support around these these ideas through the funding part is an ecosystem partners and then moving these ideas through something that we're calling an opportunity assessment. And then.

00:19:26.520 --> 00:19:42.920  
Abs Bulbuliya  
These most promising initiatives will then be spun out on this slide. Afterwards, I'll go on in a bit more detail and the whole purpose of our cooperative commercialization center is to really accelerate the economic growth of hydrogen in the region. So how that really works is.

00:19:44.150 --> 00:20:14.900  
Abs Bulbuliya  
No, uh, funny part is an ecosystem. Partners actually funding the Cooperative Commercialization center, and this is really an inspiration from the Cooperative Research Centre, the CRC model that I'm sure most of you are familiar with where universities partner with industry to do fundamental research and development. This is really on the commercialization aspect and using the similar terminology methodology. So we're looking for funding partners and ecosystem partners to be part of this cooperative commercialization center.

00:20:14.980 --> 00:20:15.460  
Abs Bulbuliya  
5/2

00:20:16.230 --> 00:20:42.360  
Abs Bulbuliya  
bring to the surface opportunities that they see in hydrogen and then creating these coalition of support around these ideas to then take him through a three month concepts today with the hope that the most promising concepts that these will then be spun out into larger scale projects like and then attract additional investment and funding to really drive the economic growth in the region. So we did open up a expressions of interest for our CCC.

00:20:43.310 --> 00:20:53.180  
Abs Bulbuliya  
In the last month and we've had a really great response from industry from academia from investors UN from startups as well. And we've closed 22.

00:20:54.310 --> 00:20:58.220  
Abs Bulbuliya  
Expressions of interest to be part of this part of this CCC model.

00:20:59.520 --> 00:21:18.370  
Abs Bulbuliya  
This is just a high level timeline of what's actually happening next in the cluster, so I was on the left hand side. So last month we we opened and closed the IOI to become part of the CCC. This month in August, we've sent out to our partners a request for opportunity assessments, so this is a.

00:21:18.840 --> 00:21:20.590  
Abs Bulbuliya  
Yeah, I document for them to you.

00:21:21.760 --> 00:21:35.520  
Abs Bulbuliya  
Bring to the surface any ideas that they have in in hydrogen, and we're hoping to run our first batch of concepts that is in hygiene between September and November to really do some practical things in the hygiene space.

00:21:36.850 --> 00:21:55.380  
Abs Bulbuliya  
After some of the examples of opportunity assessments that were talking with our partners with at the moment is what the role of hygiene in decarbonizing cement production, there's a. There's a big cement operation in the Geelong port area. There's a lot of talk around decarbonizing public transport to hygiene presses. What does that look like?

00:21:56.660 --> 00:22:02.940  
Abs Bulbuliya  
Into renewable energy into the grid to grow the supply of hydrogen. So we're really looking at.

00:22:03.720 --> 00:22:22.600  
Abs Bulbuliya  
Different ways of going the green hygiene sector and one of the bottlenecks are we do see is really how do we bring more renewables onto the create for the green green hydrogen growth? Easy advanced advanced carbon fiber technology to accelerate the hygiene, storage and transportation.

00:22:23.230 --> 00:22:42.920  
Abs Bulbuliya  
Solutions is a really great carbon fiber industry in the region. How do you? How do you provide some support for them to be part of the hygiene economy? And then obviously green ammonia from marine shipping and applications as well. So these are some of the examples of opportunity assessments being discussed and more expected during this process of requests. Opportunity assessments.

00:22:45.030 --> 00:23:06.160  
Abs Bulbuliya  
Leave it there, but I would love to talk to a lot more to people in the region around some of the ideas that they have. Or if you wanna learn more about the cluster and how how we can really help in your hygiene endeavors as well, please contact me. I'm apps will bully you. Can contact me at apps that start to become.com dot AU and you can also read a lot more about this at boot camp.

00:23:07.060 --> 00:23:09.600  
Abs Bulbuliya  
Dot com dot AU 4 slash issue on our website.

00:23:10.690 --> 00:23:11.330  
Abs Bulbuliya  
Thank you God.

00:23:11.990 --> 00:23:12.340  
Grant Sutherland  
Yes.

00:23:12.390 --> 00:23:15.400  
Grant Sutherland  
Thank you very much, I hope. See you been busy since February.

00:23:16.480 --> 00:23:31.370  
Grant Sutherland  
So that's very exciting and I just encourage you to follow up so I have been kind enough to leave his contact details there. So I encourage you to make contact and if you have some particular opportunities you want to progress.

00:23:32.210 --> 00:23:49.430  
Grant Sutherland  
So moving right along our third speaker is doctor Agent. For now. Who's the director of Deacon Energy? Obviously the decking and aver city, and so we're very fortunate to have Adrian join us today. So Adrian welcome. Thank you very much for your time and I'll hand over to you.

00:23:50.410 --> 00:23:58.820  
Adrian Panow  
Now, thank you Grant. Is this all working? No it is. That's good. Yeah, thank you and.

00:23:54.910 --> 00:23:55.800  
Grant Sutherland  
This is urgent.

00:23:59.690 --> 00:24:28.670  
Adrian Panow  
It's I for Full disclosure and transparency. Some of you will know that I'm finishing up at Deacon soon and joining University of Melbourne, but I'm here with with the best wishes of the Vice Chancellor and Deputy Vice Chancellor. So it feel this meeting certainly isn't. J isn't a conflict, but letting other people know and what I will discuss.

00:24:28.900 --> 00:24:58.490  
Adrian Panow  
It's very much a a broader view of hydrogen anyway, and it has certainly guided where Deacon is working in this space with a lot of input. I must say from people like Gabriel and others around where our focus should be in Victoria and Australia. So I'll share a slide pack because I am from a university and I have to do that to be legitimate and but only a few and happy to leave them with you as well.

00:24:58.970 --> 00:25:01.560  
Adrian Panow  
So let me share.

00:25:02.670 --> 00:25:09.990  
Adrian Panow  
Ah, this screen. Hopefully it is now going to share. The whole lot. Has that worked grant?

00:25:11.150 --> 00:25:11.850  
Grant Sutherland  
Yes, that's good.

00:25:11.850 --> 00:25:19.900  
Adrian Panow  
Yes, that's good. So take an energy abroad concept across the whole of university that pulls together all of the.

00:25:19.950 --> 00:25:28.830  
Adrian Panow  
The all the elements of of what Deacon is good at from business and bore through to the high technology and.

00:25:29.260 --> 00:25:31.950  
Adrian Panow  
Uh, they

00:25:33.290 --> 00:25:42.750  
Adrian Panow  
but hydrogen really does fit that broad model because it it isn't solved with the new device or a single application. It has to be.

00:25:43.840 --> 00:25:44.730  
Adrian Panow  
The.

00:25:45.450 --> 00:26:17.170  
Adrian Panow  
The whole transaction, and even though for many of you in the Southwest, the most visible part is high sell deacons capability in hydrogen is much broader than that. It ranges from the the real heavy research elements of membrane, membrane structure, materials, hydrogen storage in hydrides through the carbon fiber storage vessels, then through to the social sciences in license.

00:26:17.350 --> 00:26:20.990  
Adrian Panow  
Social license and engagement, and even the regulation of hydrogen.

00:26:22.560 --> 00:26:26.010  
Adrian Panow  
Couple of points just to set the context of of.

00:26:27.590 --> 00:26:43.440  
Adrian Panow  
Probably working with where Adam is going to introduce high sell to you and how we got there and what our what. Our focus very much is. So first point is that the production of hydrogen is is really quite straightforward. We've been doing it for decades.

00:26:45.040 --> 00:26:51.450  
Adrian Panow  
There are, however, challenges and the colour is most of you will be aware whether it's brown, blue or green.

00:26:52.720 --> 00:27:06.750  
Adrian Panow  
Is it really reflects its carbon footprint? And so the challenge is that we need to address is ultimately reduce costs. All of that production, right? That's important.

00:27:07.580 --> 00:27:12.480  
Adrian Panow  
We need to reduce the carbon intensity from production and this can be very much from.

00:27:13.380 --> 00:27:22.910  
Adrian Panow  
Not only the the thing that comes to mind, so blue carbon blue hydrogen from steam, methane, reforming of.

00:27:23.020 --> 00:27:53.160  
Adrian Panow  
Anne of natural gas that has a carbon footprint and there's a big debate in Europe at the moment, but in fact overnight, the chair of the UK Hydrogen Production Council resigned because he felt he could no longer represent blue carbon as it wasn't actually a sensible thing to do unless you're able to really capture your carbon dioxide output, either through production methods or.

00:27:53.210 --> 00:27:55.080  
Adrian Panow  
Is carbon capture and storage.

00:27:56.080 --> 00:28:03.410  
Adrian Panow  
The and even green hydrogen. We need to make sure that there is in fact, enough renewable energy to produce that.

00:28:04.670 --> 00:28:34.500  
Adrian Panow  
We need to find a way of storing transporting gas, whether it's compressed, liquefied, modified form into ammonia or or by a few or hydrogen based fuels safely and again at reduced cost and ultimately, and this is the blue points are really important ones here that we need to create enough opportunity to utilized the hydrogen sufficient that we end up with an uh, unsubsidised market now.

00:28:34.550 --> 00:29:05.100  
Adrian Panow  
Obviously that's a longer term ambition, but without it becauses hydrogen is just another fuel. And I do mean just another fuel, it is competing against myriad other opportunities to power things to run vehicles, to heat water and so on the so the two volumes that are important, one is volume of production. It gets cheaper the more you make, the bigger the kitties that you make it on.

00:29:05.320 --> 00:29:20.530  
Adrian Panow  
The larger volumes that you can transport and very closely linked, of course, there's no point making a whole heap of hydrogen unless you can utilize it, and so the volume of utilization in particular applications, which I'll get to is really critical.

00:29:21.160 --> 00:29:24.240  
Adrian Panow  
So I've covered off the.

00:29:25.030 --> 00:29:28.430  
Adrian Panow  
The fact that Deacon does more in hydrogen then high cell.

00:29:29.130 --> 00:29:58.850  
Adrian Panow  
But again, some will be aware that there is already an operating project on the Warrnambool campus, the hydrogen test beds that are industry LED Deacon delivered project within the Future Fuels Cooperative Research Centre or two and a half $1,000,000 project that is testing compatibility of various polymer pipelines, joining techniques, metering and so on for hydrogen, which is really important to get to if we're going to actually putting.

00:29:59.390 --> 00:30:01.940  
Adrian Panow  
Hydrogen through existing pipelines.

00:30:02.940 --> 00:30:04.170  
Adrian Panow  
The.

00:30:05.050 --> 00:30:35.930  
Adrian Panow  
That confidence has resulted in $20 million, nine million from the state government, 9 million from the Commonwealth and 2,000,000 from Deacon. Being being further invested in the water bill campus with high cells, so actions speak far louder than than pronouncements, which is that next point that when you look at the number of announcements and I wake up most mornings to a Twitter feed from H to view one of the industry magazines and get quite despondent that how can we keep up.

00:30:36.150 --> 00:30:54.470  
Adrian Panow  
But you don't have to dig all that deeply to realize that most of those projects are either really forward looking. I will deliver this in 2025, 2020, 8, or indeed, though they have such dependencies on someone buying their offtake that they're unlikely to happen.

00:30:55.290 --> 00:31:19.240  
Adrian Panow  
So it's essential that RDA in particular as a as an entity that has such influence in such strategic intent in the region, really identify some focuses on those applications of hydrogen and production, where relevant. That's actually relevant to its region and to Victoria, Australia, ultimately.

00:31:20.670 --> 00:31:51.700  
Adrian Panow  
This is a, uh, a representation of white hydrogen is, and it it's from Michael Liebrich in the UK. Michael started Bloomberg, New Energy Finance and has a lot to say around hydrogen, most of which is really quite insightful. This is the way that hydrogen is often looked at politically here can do everything and a real concern is that it is the shiny object at the moment.

00:31:51.750 --> 00:32:17.200  
Adrian Panow  
That seems to have bipartisan or or all partisan support. And yet, if you pick the wrong application, if you bring pick the wrong tool, you'll either not achieve what your what your intent is, or worse still, you'll actually do more damage then they're not going down that path. So how do we choose what's important? Which one should we focus on?

00:32:18.760 --> 00:32:50.000  
Adrian Panow  
This is Michael's next diagram that he produced a couple of days ago and he updates this regularly. The Clean hydrogen ladder and I had a bit of a small exchange with him that and he agrees it's very Europe centric. If you are in Europe and you are going to be pursuing hydrogen then this is the way that you would look at it. You the top of the ladder are those things that are very difficult to do without hydrogen because actually hydrogen is a feedstock chemically or it's.

00:32:50.250 --> 00:33:12.410  
Adrian Panow  
It's just absolutely required if you're going to end up with with fertilizer, for example, and you're producing an ammonia fertilizer, you need hydrogen. The further you go down the ladder, the more alternatives you have for achieving the same outcome, and the further you go down, the less competitive hydrogen is in that application.

00:33:13.270 --> 00:33:31.710  
Adrian Panow  
This however is very Europe centric and I need courage. The participants here to look to be very aware of that because this may well be brought up as a reason to not do hydrogen and it's actually very unhelpful because it looks formal. It's from a reliable source.

00:33:32.530 --> 00:33:45.430  
Adrian Panow  
I've recast that as what would it look like in Australian and particularly what would it look like in Victorian and Southwest settings? And you'll notice there is some blanks there that.

00:33:47.080 --> 00:34:16.600  
Adrian Panow  
Uh, significantly different in our context than they are in Europe, and there are a number of reasons here. Long distance trucks and coaches rural metro buses. So the in the in Michael's original one it had metro buses you wouldn't do in hydrogen. However, in a rural setting and I can see Steven Lucas on on the call running buses through the Southwest even though they appear to be running in a.

00:34:17.150 --> 00:34:47.430  
Adrian Panow  
You know, you know, metro environment in Warrnambool is a very different proposition to running them within a true metro environment around the city. Much longer distances much longer runs between on their on their roots and very difficult to achieve electrically because you simply don't have a network and electrical networks that will support that bulk recharging. That's an enormous investment for that can't simply be smeared across uh.

00:34:47.480 --> 00:35:19.010  
Adrian Panow  
A pretty small revenue base, and also you'd simply don't have the time to do that in that context, so hydrogen you can be producing all day. You can import it as a fuel. You can then dispense it as required very very quickly. Long distance trucks again. Same thing. Long way long distances between refueling heavy loads, batteries, makeup, non revenue cargo regional tracks again in a metro setting regional.

00:35:19.150 --> 00:35:38.200  
Adrian Panow  
Means no Dandenong to sunshine, that would be a fairly long trip within Melbourne regional in a true regional context is something quite different and again it lends itself much better. I've highlighted in a different color. In fact, adding to Michaels there be.

00:35:38.970 --> 00:35:44.070  
Adrian Panow  
Uh, yeah, I see these horrible term. But four wheel drives whatever for towing.

00:35:45.090 --> 00:35:52.250  
Adrian Panow  
The number of caravans and and trade trailers around and and even that light delivery.

00:35:52.680 --> 00:36:08.700  
Adrian Panow  
Uh, towing a load is difficult to at the moment and in the next few years with electrically driven vehicles, so hydrogen may have an application there to extend the weekend. It may please the Prime Minister for that to happen.

00:36:10.270 --> 00:36:26.200  
Adrian Panow  
The very closely related to that is, is this one that remains actually quite high on both off road vehicles. Off road means truly offroad mine sites, agricultural settings.

00:36:26.440 --> 00:36:43.720  
Adrian Panow  
Uh harvesters headers, that sort of equipment where it's actually not going to come back and be charged up at some point or refueled somewhere. You can make your hydrogen on site, install your own solar array on site, and therefore that it lends itself well.

00:36:44.860 --> 00:36:51.230  
Adrian Panow  
There's a subtlety here. Won't go into power system balancing does move up because our power systems really aren't as robust.

00:36:52.110 --> 00:37:06.610  
Adrian Panow  
And the ones in blue here I've left them where they are because using high making hydrogen and then using it for medium to low level heat even in industrial setting and heating hot water at home.

00:37:07.180 --> 00:37:38.590  
Adrian Panow  
It is a marginal use for hydrogen. However, if you are making it at a reasonable, very cost of, you know cost effective way because you're now making a lot because those applications in red have created your demand. You can afford to put it into a gas network and use it for these settings and therefore decarbonize your gas grid. So these two areas are really where the HEISSEL focuses, but I think more broadly where Australia should be.

00:37:39.070 --> 00:37:42.450  
Adrian Panow  
Focusing and I finish with one one more slide here.

00:37:42.500 --> 00:37:44.200  
Adrian Panow  
Yeah, that.

00:37:45.350 --> 00:38:17.880  
Adrian Panow  
It really is the opportunities and barriers that was requested so no one application really has sufficient value to justify huge investment in production of hydrogen, so they require volume supply chain infrastructure. How you going to move it from one to another? Tube, trailers, piping, refueling it that all has a has a cost, the social license, the education, how to use it, how? How will trucks be serviced? Held buses be service needs to be established.

00:38:18.080 --> 00:38:22.800  
Adrian Panow  
So that value stack same as a battery, multiple applications, right time, right scale?

00:38:24.040 --> 00:38:29.310  
Adrian Panow  
The local settings will very much dictate that commercial reality and.

00:38:30.520 --> 00:38:45.940  
Adrian Panow  
And hydrogen will compete. It's competing against natural gas against batteries against electricity. Get the right setting and things can actually fall into place. And ultimately, in the black points, before I get to the very last one.

00:38:47.570 --> 00:39:15.120  
Adrian Panow  
Given the pure hydrogen doesn't occur naturally, we have to make it purify it, or make it effectively from another material. That round trip efficiency sometimes wind to wheel. If you got a wind farm, you're producing hydrogen. Putting it into a vehicle. Emissions of that production really do need to be considered. This is bordering on an ethical standard where you you do need to think about what you're doing as to whether it is worth it.

00:39:15.710 --> 00:39:35.830  
Adrian Panow  
However, again to if if you have and this is the last point around the the role of government. Government creates the policy environment where decarbonization has to occur. State has a target for reduction of emissions. That target will only be.

00:39:36.400 --> 00:40:06.020  
Adrian Panow  
Uh, when it will only be met if not only government tax, but the private sector acts as well and at the moment the market simply doesn't exist, so it's not as if the market is failed. It's failed to be created, so I would strongly argue that there is a clear role of government because government recreates that setting to do that and therefore investment needs to be very targeted. Flow to where it is most efficient.

00:40:06.490 --> 00:40:19.210  
Adrian Panow  
And then that combination of the right regulatory and legislative settings as well as the investment will actually create an industry that will reach that target.

00:40:20.200 --> 00:40:21.940  
Adrian Panow  
And I will stop there.

00:40:24.910 --> 00:40:46.970  
Grant Sutherland  
Thank you very much, Adrian. As always very insightful and I think he provided this some good suggestions there around future direction. And so as I mentioned at the introduction, sort of separating at what's the hype and what's the what's the real opportunities? So I think you've given us something to to work with there, so thank you very much, Adrian.

00:41:04.580 --> 00:41:05.040  
Grant Sutherland  
Here.

00:41:05.080 --> 00:41:05.840  
Adrian Panow  
You're well.

00:41:06.250 --> 00:41:07.500  
Grant Sutherland  
Yeah, thanks very much Azure.

00:41:08.020 --> 00:41:08.290  
Adrian Panow  
Bye.

00:41:09.650 --> 00:41:11.820  
Grant Sutherland  
OK, before I head over to our.

00:41:12.960 --> 00:41:43.310  
Grant Sutherland  
Final speaker founder presented which is Adam Fletcher who is the program manager of the high Cell technology hub or just wanted to briefly mention vital background with high cell so it goes back to the Great South Coast. Economic futures work that we've undertaken over the last couple years. Crossett was Victorian that was funded initially by the five Lga's together with one water and the state government through regional partnerships. So there's a lot of consultation discussion with.

00:41:43.900 --> 00:42:13.630  
Grant Sutherland  
Uh keens repliers regulators. Government departments research and education institutions private investors. So it wasn't an economic development plan. It was really looking at how do we unlock the potential of the region to take it to another level to another level, particularly facilitating private sector investment with now at a point where we are through the funding provided by RDA, no TV into the implementation strategy for this work.

00:42:14.030 --> 00:42:33.090  
Grant Sutherland  
I just wanted to highlight that in the sense that there was in the the work highlighted 7 high value economic pathways which would provide greater product productivity and skill job creation, least included high water. Sorry, I value water, secure agriculture and order culture precincts.

00:42:33.860 --> 00:42:48.300  
Grant Sutherland  
And collaborative regional renewable generation. Sustainable land based aquaculture precincts. High value tourism networks and also significant and targeted green hydrogen industrial research and development investments. So actually having done some of this work.

00:42:48.630 --> 00:43:17.970  
Grant Sutherland  
Uh, that really facilitated provide the framework for conversation with. Initially the federal government and then the state government, which ultimately led to the high cell technology hub. So I think from the network it really has service up extremely well for mapping out, providing a blueprint for future of economy want in Southwest. So with that little bit of background, and I promise you, Adam, I haven't.

00:43:18.810 --> 00:43:24.810  
Grant Sutherland  
Side of the clock it on your 15 minutes, so you still got your 15 minutes, but I'll hand over to Adam Fletcher.

00:43:25.470 --> 00:43:35.330  
Grant Sutherland  
The size program management wholesale technology have just to provide you with an overview of the work you're doing and the impact that the project will make so welcome Adam.

00:43:36.230 --> 00:43:52.290  
Adam Fletcher  
Thanks very much. Great and good afternoon to all the participants today. I certainly thank you for the opportunity to share with you some more detail about the high sale Technology hub program and grant. I have about to start my timer so hopefully we're In Sync and we'll see how we go.

00:43:53.430 --> 00:43:58.550  
Adam Fletcher  
I'll just share my screen here. If you could let me know that's come through OK.

00:43:59.910 --> 00:44:00.960  
Grant Sutherland  
Yeah, it's so good.

00:44:01.230 --> 00:44:02.520  
Adam Fletcher  
OK, thank you.

00:44:07.540 --> 00:44:20.610  
Adam Fletcher  
Yeah thanks, sorry great. Just before I start with the detail again. When I was Adam Fletcher working with Adrian, Indian Energy is program manager for the high Cell technology hub deacons. Wonderful campus.

00:44:21.790 --> 00:44:36.830  
Adam Fletcher  
A little bit of back story Grant touched on it. Some of those discussions and targeted strategic analysis decisions around how best to respond really in that green hydrogen technology and energy transition space.

00:44:37.480 --> 00:44:46.360  
Adam Fletcher  
Uh, in 22,000 and 19 again, as as an end result of some of that work, Grant described the high sale program was formulated.

00:44:47.420 --> 00:45:16.590  
Adam Fletcher  
It was successful in an initial funding support $2,000,000 grant which really allowed the program to focus quite heavily on mapping out transition pathways in an emerging hodgdon economy. Part of that initial phase allowed the team to be formulated. So I'm one of three of the Heissel team. We do have the ability in the in the fortunate position of being really 100% focused on on the hydrogen.

00:45:16.690 --> 00:45:19.080  
Adam Fletcher  
Application space and the high sell program.

00:45:20.330 --> 00:45:30.890  
Adam Fletcher  
Quite privilege in that sense, because a lot of lot of people and networks were talking to. You know this is really in addition to at times there. There other other work that they do day today.

00:45:31.680 --> 00:46:01.230  
Adam Fletcher  
Uh, towards about the six month mark of the initial stage one program, we were able to assemble the learnings information it gathered relating to those transition pathways, and we were successful in our stage two funding and I think that's been mentioned previously as well. Both state and Commonwealth funding support with Deacon contribute contribution as well really culminates in a $20 million project, really based at WANNABLES.

00:46:01.740 --> 00:46:22.850  
Adam Fletcher  
Sorry Deacons, wonderful campus, so the funding was announced around a month ago so in essence were entered that stage 2 technology phase and and for us. What that represents is implementation of those transition pathways and activities that we identified in that stage. One focus time.

00:46:23.920 --> 00:46:25.130  
Adam Fletcher  
For those who.

00:46:26.360 --> 00:46:56.470  
Adam Fletcher  
Some of familiar, and for those who aren't familiar with Awardable campus, here it is. Here, it's around 95 hectares total size. It sits on the eastern side outskirts of 1 City or Melinda. In the background there about 6 kilometres out of town or thereabouts. It's a smallish campus, but again, it's got a good land land size available. The couple of key elements here from the area. There is certainly a cohabitation with Southwest TAFE.

00:46:56.810 --> 00:47:09.060  
Adam Fletcher  
On mobile campus, we've got the the Princess Highway frontage here, and we do have the Melbourne Geelong, sorry wanna bulge along train line as well fronting the campus and it actually has its own.

00:47:10.300 --> 00:47:21.970  
Adam Fletcher  
St Sherwood Park station. So the Heissel precinct is is to the east of the side of the campus. Here it's around 4 hectares will get to get to talking about what that entails shortly.

00:47:23.170 --> 00:47:33.460  
Adam Fletcher  
So the hospital program we mentioned those transition pathways here are the four pillars or the four focus areas. That high style is really focusing on intently.

00:47:34.010 --> 00:47:44.330  
Adam Fletcher  
Transport and pipelines really represent the the technology elements and, and we've heard probably a good amount of information about what that represents from previous speakers.

00:47:45.640 --> 00:47:52.350  
Adam Fletcher  
But ability in heavy vehicles is the transport sector innocence. Understanding how to service and refuel.

00:47:52.900 --> 00:48:24.070  
Adam Fletcher  
Up in an optimized sense, those transport services pipelines is looking at how compatible existing gas natural gas infrastructure is to convey hydrogen and the education of social license pillars. Really not particularly technology focused, but as important as the technology to ensure that we do have a strong social license. We do have hydrogenated communities and we do have a skilled workforce able to support this emerging hydrogen economy.

00:48:28.210 --> 00:48:50.830  
Adam Fletcher  
So in terms of, I guess one of the one of the objectives of high salad dressing that the transition to a clean energy future. So Adrian referenced earlier. There's announcements every other day. There's some scaled projects and and lots of different sorts of projects. So what we see what makes the high style program different is a focus on real outputs and real outcomes.

00:48:51.470 --> 00:49:12.710  
Adam Fletcher  
I mean, in in the spice of those four focus areas and those four pillars. Here is a I guess those outcomes really. What will it represent to first of all, the Southwest region and from there, what are the learnings one of the programs, one of the systems? And what are the learnings that we can share more broadly to really support and contribute to this emerging economy?

00:49:15.300 --> 00:49:45.390  
Adam Fletcher  
Again, I want to stress that point about the technology, parts and the and the not so technology parts, the humanistic parts we see that is vital to to growing the industry agent says Hudgens been around for quite some time and absolutely it has the technology here is is not particularly heard. Lower barrier that the technology is available. It's been operating overseas for many many years and and some of the technology operates already in Australia.

00:49:45.500 --> 00:49:59.040  
Adam Fletcher  
We are yet to have a proper insensible and fully aware understanding in our communities and industries about the role of hydrogen and the and how it can be utilized. Nor do we have, uh, yet have a skilled workforce.

00:49:59.650 --> 00:50:17.150  
Adam Fletcher  
That being the case, 50% of our time is focused on that, so we see that as a quite a differentiated differentiation for the hostile program. To ensure that the research outcomes and the technological outcomes that we're looking to achieve are supported by those humanistic factors.

00:50:20.160 --> 00:50:27.900  
Adam Fletcher  
This and the test bed again. Adrian had reference that here's a couple of snaps of the test bed in its final stages of construction.

00:50:29.020 --> 00:50:58.850  
Adam Fletcher  
It's very, very simple. Its existing gas infrastructure dug up ready to be replaced in an asset replacement program, basically salvage, then reassembled in our test beds so that research work with the Institute of Frontier Materials and the Future Fuel CRC is currently underway. We have these networks filled with 100% hydrogen, so there's a. There's a differentiator in itself in the Gabriel mentioned some blending projects.

00:50:59.160 --> 00:51:11.990  
Adam Fletcher  
We're sort of going straight to the end goal here to understand exactly how those existing networks may behave and what are the elements that we need to understand before any sort of large scale transition can occur.

00:51:13.000 --> 00:51:42.460  
Adam Fletcher  
And this top photo here is of particular interest to us, and we're quite proud. And that we've we've had some information days at the sandpit. And that's a cohort of Southwest TAFE. Pre apprenticeship students come down to to have a look around and very pleased to announce or or say that the response from the students were quite a wild in terms of levels of interest and the types of questions.

00:51:42.670 --> 00:51:53.840  
Adam Fletcher  
And the types of considerations, even in a 20 minute session, that those these students had come to realize it was. It was really quite encouraging and we will talk about upskilling.

00:51:54.670 --> 00:52:19.730  
Adam Fletcher  
You know there's transitioning transitioning of existing workforce isn't technically technicians, but there's also the training of those up and coming technical, an apprenticeship style students, so it really good start for us, and working closely with Southwest TAFE to ensure that those education framework exercises can be developed sensibly and again implemented into vocational education.

00:52:22.280 --> 00:52:52.470  
Adam Fletcher  
A large part of the stage, two wholesale stage, two phase and technology phase, is a dedicated facility to be constructed constructed on the water or campus. This facility has a primary goal of enabling hydrogen fuel, so manufacturing and assembly and development and testing, so it represents the first of its kind in Australia and in essence, apart from those other functions you might see on the screen in the in the blue text.

00:52:53.320 --> 00:53:06.680  
Adam Fletcher  
It really gives a provides an opportunity not only for research, but to really establish a local or Australian based entry into the fuel cell. Innovation and technology space.

00:53:07.350 --> 00:53:37.220  
Adam Fletcher  
At the moment is predominantly northern hemisphere. Anything really to do with hydrogen fuel cells is Nolan Hemisphere based. Anything that we may produce as a country or as a university and we want to validate it goes. It's gets shipped to the northern Hemisphere and potentially current understanding from from our research is that there can be up to two years to get a product in a in a public test facility to validate.

00:53:37.510 --> 00:53:57.250  
Adam Fletcher  
Any form of fuel, so evolution. So this provides certainly in Australian, first again based it would campus and in their support activities based on those four pillars mentioned earlier will also be cultivated and grown in the site in the space as well alongside the fuel cell research.

00:53:59.390 --> 00:54:28.960  
Adam Fletcher  
A couple of other elements as well. Again our our program. We feel that's got some unique elements with we're focused on real outcomes. We have had 12 months of Savannah landscape understanding. You know, industry opportunities, funding mechanisms, etc. So couple of I guess couple of those examples of some of those are current and initial outputs. This little shot on the left.

00:54:29.150 --> 00:54:59.420  
Adam Fletcher  
Top left here is our first fuel, so research piece of research equipment. It's a specialized medical care from our supplier out of Vancouver in Canada, and very soon that will be operational. It arrived Tuesday this week, very soon that will be operational and our research group will start to actually test and compile and build and start to understand components of fuel cells so.

00:54:59.500 --> 00:55:29.420  
Adam Fletcher  
Very soon will be actually active in in fuel cell research starting at the Kenmore ponds and once the facility we've seen in the previous slide is commissioned. This equipment will be relocated and joined up with some larger equipment. Once at facility is available. Yeah, bottom shot here. That's that's a shot of a, uh, Ken, Worth hydrogen prime mover, hydrogen powered electric prime mover. There's ten of these at the moment in operation in the port of Los Angeles.

00:55:29.510 --> 00:56:00.220  
Adam Fletcher  
Then we have a partnership with Ken Worth Australia, who's one of the companies from PACCAR International and one of those trucks is coming out towards the end of this calendar year and it will be integrated into our mobility transport focus pillar where we will start to learn and focus on firstly how a hydrogen heavy vehicle operates and secondly start to integrate with this equipment somebody equipment.

00:56:00.280 --> 00:56:22.050  
Adam Fletcher  
Are you saying that uplift supporting development of new fuel cell technologies? Once that is done in a facility scale, will be integrated into it into Ken Worth truck to then start to test and understand exactly how that can move to higher power fuel cells? Really in in light of providing Ken worth?

00:56:22.480 --> 00:56:32.160  
Adam Fletcher  
A commercial product suitable for Australian conditions. Really heavy haulage be double loads around about 1000 kilometer range.

00:56:33.470 --> 00:56:56.510  
Adam Fletcher  
The top photo here. This is one of the first schools private schools sessions that are education pillar has produced. This is our delegate in a I think it's a port fairy so Patrick's import very running a very basic session talking about hydrogen energy and we've got some little fuel cell models as well, which I think Brees holding there.

00:56:57.680 --> 00:57:01.580  
Adam Fletcher  
So we're active in the community. We've got some very strong industry partners.

00:57:01.630 --> 00:57:32.170  
Adam Fletcher  
Uhm, one of which being Steven, who's with us here today. Who's been working on their bus project for quite some time. At the moment we're supporting Stevens project and model bus lines via looking at modeling to understand how a proposed network applied in buses can be refilled with hydrogen. Obviously hydrogen gas to meet and maintain timetable objectives. So I think one of those points Adrian made about.

00:57:32.220 --> 00:57:50.500  
Adam Fletcher  
How broad and I think others have made a similar point. There's so many elements to this this economy or this. This activity is energy transition and we are very pleased to advise and share information on exactly which of those elements we've made some good progress on.

00:57:53.720 --> 00:58:18.370  
Adam Fletcher  
Some of the challenges it's being called before barriers, but I think being the optimistic engineer I'll call them challenges an and. The challenge then becomes finding solutions to those those challenges. I think these are really potentially being addressed to some extent as well. Regulation, safety, safety and standards is is as paramount as any of those other elements. If not, perhaps more so.

00:58:19.490 --> 00:58:37.990  
Adam Fletcher  
There are no existing standards and regulations directly applicable at the moment. There's a lot of work going on to develop and have these evolved to support this emerging economy and we're working closely with the likes of energy. So Victoria and stands Australia to to help on that quest.

00:58:39.100 --> 00:58:51.020  
Adam Fletcher  
Social license is significant as well. You know, awareness versus acceptance is what we sort of ponder ourselves. There's growing awareness, but acceptance is the next hurdle in that community and industry space.

00:58:52.000 --> 00:58:55.760  
Adam Fletcher  
Financial hurdles adriaens touched on those as well.

00:58:56.490 --> 00:59:11.820  
Adam Fletcher  
Uh, it's significant this early in the scheme of things. Scale is key, but is there demand first or or production first? You know the chicken or egg skilled workforce touched on that very important as well.

00:59:12.820 --> 00:59:24.470  
Adam Fletcher  
And another thing we see is very critical as things like those announcements continue lots and lots of interest. Growing interest in participating in this in this transition.

00:59:25.490 --> 00:59:52.570  
Adam Fletcher  
There's lots of information around, we see it's vital that there is consistency across all facets, its terminology, it's pricing, its energy value, its comparative data. It's all of those things. If there's not, consistency leads to chaos. Everyones sending mixed messages at least the confusion and potentially it makes people think it's too hard. I'll go back to what I know and and a lot of the a lot of the cases.

00:59:53.280 --> 01:00:05.660  
Adam Fletcher  
But what I know is carbon. What I know is diesel. It's tried and tested and it's reliable. So leave all the hype. Let's stick with what we know so we feel that's potentially one of those impacts of not having consistent messaging.

01:00:08.340 --> 01:00:19.390  
Adam Fletcher  
That's all for me. Granted, thank you very much again for the opportunity to supply these slides if that's of interest to the Members today and there's some contact details there as well.

01:00:21.100 --> 01:00:31.400  
Grant Sutherland  
Yeah, thank you very much. It really is an exciting project is truly transformative. It's creating jobs, it's reshaping in a positive way.

01:00:21.410 --> 01:00:22.380  
Adam Fletcher  
Yeah, thank you very much.

01:00:31.450 --> 01:00:48.840  
Grant Sutherland  
I, uh, employment profile for the region so we, you know, we're really excited about that. And it's it's basically the convertible, but it's also, you know, really going to have great benefits right across the southwest and how we join it up. Even further's are really important.

01:00:50.200 --> 01:00:52.290  
Grant Sutherland  
Right now, according to the original.

01:00:53.660 --> 01:01:12.180  
Grant Sutherland  
Agenda we were actually going to go and do a site visit now. Walk over to the high sell testbed research facility, so obviously that's not possible today. But we are planning to do that at some station in future, so we will let you know that and just probably.

01:01:12.890 --> 01:01:31.360  
Grant Sutherland  
If, if what? Why organizations that you represent would like Adam to come and present on high cell, please just reach out there to myself. Alistair Mccosh is in on this call or we're heading directly, obviously, but I think it's really important that everyone in the region understands the work would work that we're doing.

01:01:32.640 --> 01:01:33.490  
Grant Sutherland  
So we know.

01:01:34.050 --> 01:01:45.320  
Grant Sutherland  
Gonna move into questions if we have any and I know what this is, ask the hard question. I was just looking at that same who can? I you gotta hand that handle that over to.

01:01:45.500 --> 01:01:47.900  
Grant Sutherland  
Come on, I know we still have.

01:01:49.240 --> 01:01:51.390  
Grant Sutherland  
I think every L still with us.

01:01:53.610 --> 01:01:57.040  
Grant Sutherland  
I have to stay with us out and whether anyone would like to have a.

01:01:58.000 --> 01:01:59.080  
Grant Sutherland  
Have a go at it.

01:02:00.840 --> 01:02:11.840  
Grant Sutherland  
I guess for my so people can see the question at least as rose, which is a very valid one. How do we sort of stand out? I suppose if I paraphrase it, how do we stand out?

01:02:12.560 --> 01:02:22.140  
Grant Sutherland  
As a region in terms of such would appear to be a competitive space, so my sort of starting point to answer that would be.

01:02:22.990 --> 01:02:35.260  
Grant Sutherland  
Just looking at the project, we have a live project moment with Horsell, so that's developing enormous capability and credibility and outcomes. So you've got something there, you tangible, we can actually leverage from. So I think that.

01:02:36.870 --> 01:02:45.270  
Grant Sutherland  
Would be would be one point. I think. The other thing is to look at and I guess today hopefully it's helped everyone understand.

01:02:45.840 --> 01:02:53.900  
Grant Sutherland  
Uh, I have a better understanding of the the green hydrogen economy that has a region. Yes, there are a lot of announcements.

01:02:55.010 --> 01:03:07.770  
Grant Sutherland  
As Adrian says, almost on a daily basis, but you know, we don't. We don't necessarily want to play every single space, and we can't play no response. I think it's about how do we narrow it down. So getting back to your point, Lisa, how do we actually then?

01:03:08.060 --> 01:03:20.580  
Grant Sutherland  
Uh, it really clear and have a, you know, a really compelling narratives that we actually present to to government and industry around what our compare their points of difference are. So I think that's.

01:03:21.530 --> 01:03:33.090  
Grant Sutherland  
Sort of my first go at it and without sort of continually going on about. I say like I think Adam mentioned it as an example and I think it really is a really.

01:03:34.760 --> 01:03:40.510  
Grant Sutherland  
A true example in the terms of collaboration between 3 levels of government.

01:03:41.910 --> 01:03:43.950  
Grant Sutherland  
Industry partners who are.

01:03:44.520 --> 01:03:57.870  
Grant Sutherland  
Really actively involved, really bold into it. As I mentioned, we've got Kim worth shipping at a truck out from LA to downtown Warner Bull. Where wanna bus lines?

01:03:57.920 --> 01:04:28.190  
Grant Sutherland  
Uh, which? Leaving on our hand you in a minute so we have a whole host of industry partners really engaged. We have education programs right from primary school, secondary vocational, higher Ed. So we've got this sort of education research side of it. And a big part of it which Adam spoke to his around the community, engagement and socialize. And so I'm obviously very biased here. But I think you know that shows that sort of to me is a bit of a template of how we move forward so.

01:04:28.520 --> 01:04:29.820  
Grant Sutherland  
Steven over to you.

01:04:31.930 --> 01:04:35.470  
Stephen Lucas  
Thanks great on you lay should ask the hard questions sure why stars?

01:04:35.870 --> 01:04:43.210  
Stephen Lucas  
Uh, least where I think the answer to your question is that the projects including one of us lines project in.

01:04:44.500 --> 01:05:04.110  
Stephen Lucas  
In cooperation with high sellers are in an end to end project that's includes everything. There's no blue sky. There's no will. If something is thing I happens will do things Ed and the rest of it. We've got all three levels of government involved as Grant said.

01:05:05.720 --> 01:05:12.580  
Stephen Lucas  
For the bus project, where we're going to run the regional urban bus operation on H2.

01:05:13.920 --> 01:05:42.540  
Stephen Lucas  
We've we've got, obviously Deacon involved ourselves for Southwest, TAFE and Deacon involved in the education and training, which is a huge part of this whole process because it's where there's a gap in in in both battery electric vehicles and in hydrogen fuel cell vehicles, they're both electrically driven vehicles, but there at the moment not the training.

01:05:44.500 --> 01:06:06.500  
Stephen Lucas  
Curriculums available, and there's certainly not standardized across the state, so there's a huge amount of work that we've got to do there. And we've already started on that with Deacon and Southwest TAFE, and respecting the New South Wales, which is down a fair, fair way down the track in terms of curriculum with battery electric vehicles, but hasn't done anything on hydrogen.

01:06:07.650 --> 01:06:12.500  
Stephen Lucas  
The other people we've got involved or obviously bus build is fuel cell electric.

01:06:14.280 --> 01:06:41.730  
Stephen Lucas  
Fuel cell electric vehicle people who deal in fuel cells and chassis supplies. So we sort of close the loop and we're not proposing to do a like peissel. We're not proposing a one year trial or a demonstration project. This project is going to run for the life of the vehicles at 15 years, so this is a real life demonstration of what is going to happen in our environment.

01:06:42.330 --> 01:06:48.570  
Stephen Lucas  
In the future with fuel cell electric vehicles, now the battery electric fields are another.

01:06:49.600 --> 01:07:05.410  
Stephen Lucas  
Type of electric vehicle. But we're proposing fuel cell electric. And we, as as Grant said, it's going to be an exemplar of how to do it. You will find lots of problems along the way, but we will also find the solutions to those problems.

01:07:07.070 --> 01:07:07.560  
Stephen Lucas  
Thanks.

01:07:07.970 --> 01:07:09.610  
Grant Sutherland  
Yep, thanks very much.

01:07:11.110 --> 01:07:22.360  
Grant Sutherland  
Uh, I just wondered whether this is probably unfair, but I notice absent Gabriel is still on the line, is there anything you want to add to the conversation in terms of responding to leases?

01:07:23.740 --> 01:07:29.550  
Grant Sutherland  
Question and the animal say hands up, but I'll just hand to abson Gabriel if they would like to.

01:07:30.370 --> 01:07:42.240  
Abs Bulbuliya  
Yeah, absolutely. I got can go first. Yeah, I think this is one of the questions that we asked when we first looked at the classes. What can we as a region we were famous for and?

01:07:42.860 --> 01:08:13.370  
Abs Bulbuliya  
There we are seeing some real opportunities is especially on the demand side. Actually create some projects so some actions around that. The other part is there's there's gonna be technology sector filter on hydrogen. The quad itself. So the hydrogen atoms are generated from a from electrolyzer or one, but there's going to be a case for the G to sit alongside the actual hygiene itself. So how do we develop that tech sector?

01:08:14.090 --> 01:08:42.110  
Abs Bulbuliya  
The region we've got like then really amazing universities. We've got real entrepreneurship in the in the region as well. Hopefully we have a whole number of projects in the region that can be leveraged as well. So our goal is to really build that technology sector alongside the commodity itself and also to bring international expertise and technology into the region to accelerate the growth of of hydrogen. So in the feature as a region where not just exporting hygiene.

01:08:43.300 --> 01:08:54.990  
Abs Bulbuliya  
Items internationally, but also the technology expertise internationally as well. So I think that's where we do really see a competitive advantage for the for the Geelong and and balance Southwest regions that we really want to build.

01:08:56.230 --> 01:08:58.800  
Grant Sutherland  
Like steps carry out, did you want to come in?

01:08:59.190 --> 01:09:33.640  
Gabrielle L Henry (DELWP)  
Yeah, I'd love to an I just want to sort of again underscore that we really do see that sort of Geelong and bar in Southwest region is really having a series of sort of magic ingredients when it comes to renewable hydrogen economy. There's some things that you just can't replicate elsewhere and I'll put that in a certain national and international context based on some of the conversations we've been having so nationally. We've seen some of the hydrogen investment that's been happening on big projects tends to be it sort of places that might be out in the desert and I don't really need to anything else. They sort of throw a lot of money at.

01:09:33.720 --> 01:10:05.720  
Gabrielle L Henry (DELWP)  
With big projects that might be associated with the mine, or they might be next to a port, but there's nothing else there. There's no industry, there's no education, and what we're seeing. I think Andrea Adrian pointed that out as well. You need to get these projects off the ground. You need to get economies of scale. You need to have in a number of different end uses. There needs to be transport. You know whether that sort of back to base, such as buses or long haul vehicles. And also you need to sort of have industry Anna various other different uses to create a bit of a hub in an ecosystem.

01:10:05.950 --> 01:10:38.310  
Gabrielle L Henry (DELWP)  
And one of the one of the things that we're hearing from international investors that are sort of looking at the opportunities to generate hydrogen, particularly for export. You need that combination of deepwater ports. And obviously, there's a couple in the region. As I pointed out. But you also most importantly, need then proximity to renewable energy resources near those deepwater ports. And there's a lot of countries. Even if you sort of consider Europe, it seems like a very long way away. They're looking at Australia and sort of saying, OK, you've got areas where you can use hydrogen.

01:10:38.360 --> 01:11:08.850  
Gabrielle L Henry (DELWP)  
But you can also connect into your renewable energy resources nearby. You've got your deepwater ports nearby. You can readily create as much hydrogen as you want to export. Intuition are international markets and there saying that is being very attractive, and I think you know we're already seen some sort of investment from comfort countries such as Japan over. On the other side of the state in the hydrogen energy supply chain project. Looking at producing that sort of pilot with brown colon.

01:11:10.130 --> 01:11:28.910  
Gabrielle L Henry (DELWP)  
Moving that into sort of hydrogen virus shipped to Japan, but ultimately the long game is there looking at to decarbonize their sector is green hydrogen and that really needs those ingredients that we feel that the bar in Southwest region offers very strongly.

01:11:29.730 --> 01:11:33.910  
Grant Sutherland  
Alright great, thanks very much aerial Adam and then I'll go out in that.

01:11:35.970 --> 01:11:37.040  
Adam Fletcher  
Yeah, thanks grant.

01:11:38.930 --> 01:12:09.830  
Adam Fletcher  
I've got a little learning Lisa that's stuck in my mind and it was about week too high, so it's over. 12 months ago we spoke a few times with reps from the city of Marist at and and that was that they were involved to some extent in this sort of those early formation stages of high soul, their sister city to Waterville City. And they're they're very progressed with hydrogen. Yeah, they've got trains, they've got off grid houses. It's it's the normal over there for the community.

01:12:10.160 --> 01:12:40.710  
Adam Fletcher  
6-7 years on there being highly successful, so that was of interest, because here we were trying to emulate that in one table, so discussions were. So tell us, tell us a secret. How do you get that far this soon? And what are the lessons learned? What would you have done differently? And the thing that stuck and we we say it often in our team demonstrates demystify, don't print brochures. Don't do PowerPoints. Demonstrate to demystify and that rings true, and that's probably why you see photos of.

01:12:40.910 --> 01:13:14.170  
Adam Fletcher  
Seemingly pretty irrelevant little boxes that look like fuel cell. Yeah, that's that's the real stuff and and a bit like every hour saying it's it's around the corner. It's on campus. We might we let out on an open day in Wantable City. It's not out the back of Karratha somewhere in your read about in the paper. It's starting to integrate it into everyday thinking, and we want to have we want to provide exposure to people like this, correct? It's cool kids to industries to Rotary clubs. It's just that normalization and that's that's a big part of our work.

01:13:14.220 --> 01:13:26.910  
Adam Fletcher  
We're not trying to be too ambitious. We don't want a 10 MW site and make lots of money. That's that's down the track. We just wanted to take a sensible, modest bite and just see what we learn and scale up when the time is right.

01:13:28.070 --> 01:13:28.490  
Grant Sutherland  
Thanks, Adam.

01:13:29.520 --> 01:13:30.030  
Grant Sutherland  
Net.

01:13:31.250 --> 01:13:38.860  
Nat Anson  
Thanks, Grant has a net and bone regional partnership. I'd probably question for Gabriel, just in relation to.

01:13:31.270 --> 01:13:31.780  
Grant Sutherland  
Welcome.

01:13:39.500 --> 01:13:42.730  
Nat Anson  
The Infrastructure Victoria report that came out today.

01:13:44.160 --> 01:13:52.100  
Nat Anson  
A couple of the recommendations refer to hydrogen in terms broadly towards domestic use in through the gas network and then.

01:13:52.750 --> 01:14:16.820  
Nat Anson  
Through consumer choices with product vehicles, but a lot of the conversation today is been around industry and and hydrogen utilization within economic development. Just curious about Delps sort of contact with Ivy and you know within the inner workings workings of government, how aware of this sort of stuff. Yeah, those sorts of strategies for the.

01:14:18.030 --> 01:14:51.860  
Gabrielle L Henry (DELWP)  
Yeah, I think you know. Obviously we work closely with our colleagues across the various different departments, and I think this sort of the different departments might have slightly different views that are complementary in terms of taking a different lens when they look at different parts of the sector. And I think if you sort of go back and look at the Swiss Army knife analogy, there's so many things happening in so many areas that are evolving so quickly, and that's why our renewable hydrogen industry development plan is not a two page document. It's not a 10 page document, it's about 65 pages.

01:14:51.910 --> 01:15:26.540  
Gabrielle L Henry (DELWP)  
It's quite comprehensive. It's looking at, you know, what do we need to build a solid foundation right across the industry in terms of doing things? Sort of right at the base level. If you looking at this part of your question, you know at the sort of what is going to sort of launch off first, whether it's going to be domestic passenger vehicles or more. The larger freight. I think there has been more work sort of in multiple studies that have shown that it's really the the largest scale back to base vehicles that are probably going to take up the opportunity.

01:15:26.800 --> 01:15:53.760  
Gabrielle L Henry (DELWP)  
1st, and that's primarily just it's a weight consideration. The larger vehicles can't really sort of. They gotta to a trailer behind them. With all the batteries they need, sort of to get up and running, and hydrogens and more efficient way of being able to do that. And it's also faster to refuel, so there's a little bit of a horses for courses there, but we have to look at the whole range of things of what we're going to need to do to build a renewable hydrogen economy. And we need to consider all parts of that.

01:15:55.430 --> 01:16:01.260  
Grant Sutherland  
Alright, thanks Yep Yep, I'm just conscious of time, so we might wrap it up. That's OK.

01:16:02.810 --> 01:16:14.520  
Grant Sutherland  
I'm sure we'll be sending out the contact details of our speakers today, so if there's anything particularly want to follow up, you can follow up there or through RDA and we'll. We'll make sure we come back with.

01:16:15.670 --> 01:16:44.670  
Grant Sutherland  
With a response back to you so I can firstly thank our presenters so Gabrielle ABS adaman Adrian. Thank you so much for taking the time. Very generous with your time today and thank you very much for your presentations and thank you everybody who joined us today, so hopefully it's been of value to an will look forward to progressing in the green hydrogen economy imbalance Southwest, so I'll leave it at that. Again, thanks to everybody.

01:16:44.790 --> 01:16:45.930  
Grant Sutherland  
Enjoy the rest of your day.

01:16:46.610 --> 01:16:47.080  
Grant Sutherland  
Yeah.

01:16:48.020 --> 01:16:48.450  
Andrew Goodsell  
Thank you.

01:22:49.730 --> 01:22:50.320  
Lyn M Moore (DJPR)  
Like it?

01:22:52.860 --> 01:22:53.630  
Lyn M Moore (DJPR)  
Like example.

01:22:54.430 --> 01:22:54.780  
Lyn M Moore (DJPR)  
Correct?

01:22:56.040 --> 01:22:56.840  
Lyn M Moore (DJPR)  
Yeah.

01:22:57.550 --> 01:22:58.810  
Lyn M Moore (DJPR)  
And barely got Scrabble.

01:23:04.600 --> 01:23:05.260  
Lyn M Moore (DJPR)  
And.