

DELPHI SURVEY RESULTS

ISSUE 1:

ENERGY DEMAND MANAGEMENT



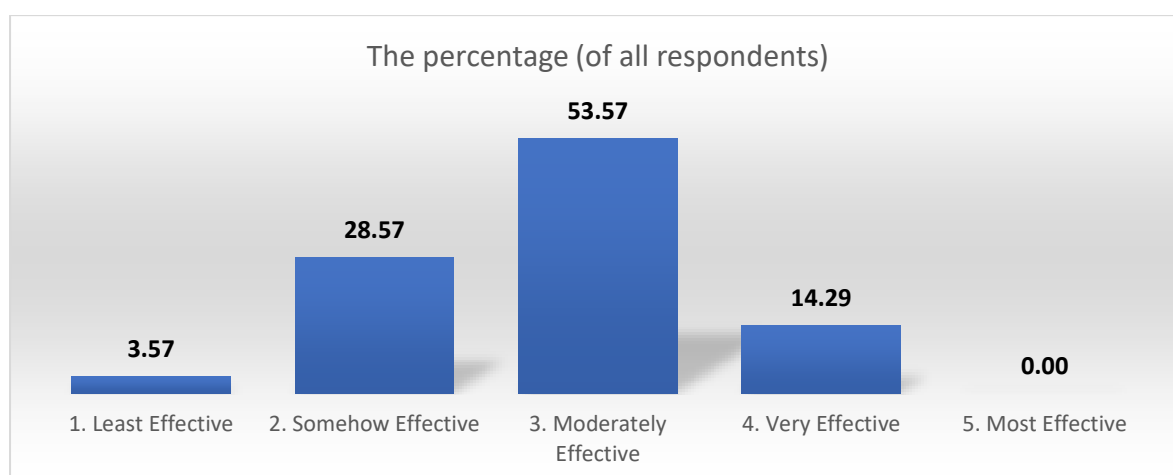
Energy demand management refers to the strategies and practices employed to efficiently control and reduce the amount of energy required to meet various needs, whether in residential, commercial, or industrial settings. This involves implementing measures to balance energy supply and demand, minimize peak energy usage, and enhance overall energy efficiency.

Some common methods of energy demand management include load shifting, peak shaving, demand response, and the adoption of energy-efficient technologies and practices. The goal is to achieve a more sustainable and cost-effective energy consumption pattern while ensuring reliable energy supply and minimizing the environmental impact.

This survey focuses on the aspects of energy demand management encompassing:

- 1.1 Energy Efficiency
- 1.2 Energy Intensity
- 1.3 Electricity Demand

1. On a scale of 1 to 5, please rate the effectiveness of the current energy management system in optimizing energy consumption and cost savings within your economy.

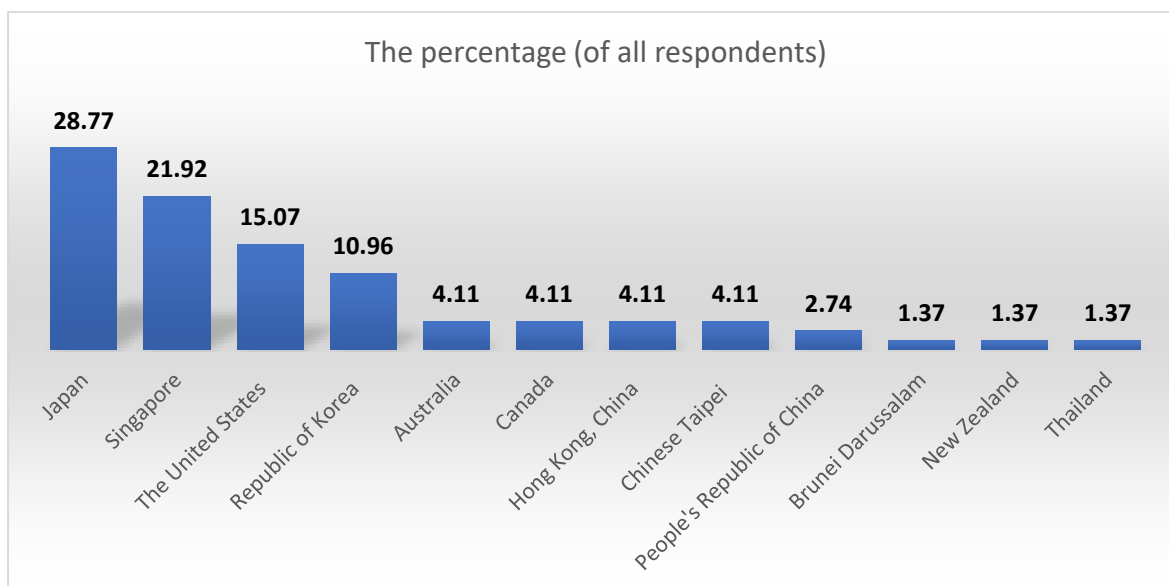


Rate the effectiveness	Comments
1. Least Effective	<ul style="list-style-type: none"> ▪ Papua New Guinea has never implemented any energy demand management methods.
2. Somewhat Effective	<ul style="list-style-type: none"> ▪ The bills for electricity on prepaid basis. The more your consumption, the more you have to pay. ▪ I think that energy management systems in the public sector are not that efficient, although there are some advanced efforts in the private sector. ▪ Limited markets in the energy sector. ▪ EnMS is not yet widely adopted. ▪ Lots of initiatives, little real implementation. ▪ Lots of initiatives, little real implementation. Emphasize

Rate the effectiveness	Comments
	<p>mainly on household consumption, promoting appliance efficiency. Little has been done on industrial, transport and building sectors.</p> <ul style="list-style-type: none"> ▪ The Russian economy is not energy effective because we have too much cheap energy resources
3. Moderately Effective	<ul style="list-style-type: none"> ▪ President office control the decision-making and one company monopoly the business. ▪ Some energy efficiency policies, ex. energy efficiency standards and labeling for appliances and buildings are effectively used. ▪ Some demand-side management (DSM) programs, ex. energy efficiency standards and labeling for appliances and buildings are effectively used. ▪ Results obtained through voluntary agreements see reduction on the order of 5 to 10% over 4 years. A decent result but not aligned with net 0. ▪ "Improve energy efficiency" is one of the six major principles of energy policy in Chinese Taipei. Key policy guidelines include Energy productivity should be enhanced ; Energy saving should be emphasized in each sector ; Energy prices should be determined laissez-faire ; and Energy prices should reasonably reflect social cost through related taxes and fees. ▪ Not all are aware and knowledgeable of energy management systems in my economy. ▪ Thailand's energy management system is making progress towards optimizing energy consumption and cost savings. However, the ratings reflect the need for more efficient governance, transparent and coordinated policies, and a stronger push towards a complete transition away from fossil fuels. Continued efforts in these areas would likely lead to a more sustainable and cost-effective energy consumption pattern. ▪ Although some measures have been effectively implemented, e.g., appliance labeling schemes, tax rebates, LED lighting, etc., a lot more can be done. For example, strict enforcement of BEC and minimum energy efficiency standards for appliances and equipment, implementing energy efficiency resource standard (EERS), support for building retrofits, promoting Net zero energy buildings (NZEB) and positive energy districts (PED), incentivizing demand response, data-driven energy management, industrial automation, etc.
4. Very Effective	<ul style="list-style-type: none"> ▪ The company has managed energy use efficiently for a long time, but technology is constantly evolving and changing to increase efficiency. ▪ The jurisdiction possesses a comprehensive legal framework (Energy Management Law) that establishes mandatory management regulations for major energy users, primary energy consumers, and energy-using equipment and appliances. Additionally, <u>it features a complete system for energy conservation, encompassing objectives, promotion</u>

Rate the effectiveness	Comments
	<p>strategies, research and development in technology, demonstration applications, development of the energy-saving industry, educational campaigns on energy conservation, and a system for energy audits and advisory services.</p> <ul style="list-style-type: none"> ▪ The jurisdiction possesses a comprehensive legal framework (Energy Management Law) that establishes mandatory management regulations for major energy users, primary energy consumers, and energy-using equipment and appliances. Additionally, <u>it features a complete system for energy conservation</u>, encompassing energy intensity target, promotion strategies, research and development in technology, demonstration applications, development of the energy-saving industry, educational campaigns on energy conservation, and a system for energy audits and advisory services. ▪ Progress of energy efficiency tracking has been good.
5. Most Effective	-

2. Based on your justification, please select up to three APEC economies that their energy demand management policies are implemented effectively.



APEC economies	Comments
1. Japan	<ul style="list-style-type: none"> ▪ Very active in increasing renewable energy and has a good strategy for energy demand management. ▪ Hydrogen Supply chain. ▪ Comprehensive energy conservation policies and promotion practices. ▪ Japanese government keenly aware the huge cost of imported fossil fuels. ▪ Energy-saving labeling system. ▪ The more expensive energy resources are the more effective

APEC economies	Comments
	<p>is energy demand policy. It is also related to overall quality of life.</p> <ul style="list-style-type: none"> ▪ Because Japan does not produce fossil fuels and heavily relies on imports, they have an effective energy demand management policy. ▪ Japan has been a leader in energy efficiency and demand-side management, especially after the Fukushima Daiichi nuclear disaster in 2011. The country has implemented various measures to promote energy conservation and efficiency. ▪ Japan has made significant advancements in energy-saving technologies, especially in household and commercial appliances. After the 2011 earthquake, Japan introduced rigorous policies to reduce energy consumption, focusing on energy efficiency and renewable energy. The country has been a pioneer in the adoption of smart grid technology and has invested heavily in renewable energy sources. ▪ Japan's energy intensity is one of the lowest in the world due to effective policy and innovation. In particular, energy consumption in the manufacturing sector has remained virtually unchanged since the oil crisis in the 1970s, and the energy efficiency of electric appliances has improved by 40 to 80% over the last 20 years or so thanks to technological innovation.
2. Singapore	<ul style="list-style-type: none"> ▪ Because they are 100% dependent on imports for energy and efficiency is a question of efficiency. ▪ Quite well functioning market. ▪ Various energy management. ▪ The more expensive energy resources are the more effective is energy demand policy. It is also related to overall quality of life. ▪ Similar to Japan Singapore does not produce fossil fuels and heavily relies on imports, they have an effective energy demand management policy. ▪ Singapore has implemented various initiatives to enhance energy efficiency, including the Singapore Energy Labeling Scheme and programs promoting energy-efficient technologies. ▪ Green Mark Program for building. Singapore invests heavily in smart technology to optimize energy use in its urban environment. There are initiatives to reduce energy consumption in the industrial sector, which is a significant part of Singapore's energy usage.
3. The United States	<ul style="list-style-type: none"> ▪ Very active in increasing renewable energy and has a good strategy for energy demand management. ▪ Select States provide government assistance. ▪ The current US administration work on climate change issues, by passing Inflation Reduction Act and the Infrastructure Investment and Jobs Act (IIJA), providing incentives to save energy. ▪ ENERGY STAR certified products, Product ENERGY GUIDE.

APEC economies	Comments
	<ul style="list-style-type: none"> ▪ Diverse Energy Efficiency Programs/ Investment in Renewable Energy/ Leader in Technology.
4. Republic of Korea	<ul style="list-style-type: none"> ▪ Quite well functioning market. ▪ Stringent industrial and equipment efficiency management regulations. ▪ Korea launched a new pilot programme for Auto DR in December 2022, where intelligent appliances automatically respond to demand reduction requests instead of consumers' manual entries, resulting in a 24% improvement in electricity savings (https://www.iea.org/energy-system/energy-efficiency-and-demand/demand-response) ▪ The more expensive energy resources are the more effective is energy demand policy. It is also related to overall quality of life. ▪ South Korea has also been active in promoting energy efficiency and has introduced policies and programs to manage energy demand effectively.
5. Australia	<ul style="list-style-type: none"> ▪ The new Technical Regulator Guideline, South Australia is mandating certain air conditioners installed after 1 July 2023 to be demand response ready (https://www.iea.org/energy-system/energy-efficiency-and-demand/demand-response%20nder) ▪ Australia participated in the IEA's Energy Efficiency Appliance and Equipment Standards and Labeling Programmes (EES&L) programs. Its well-designed policies encouraged product innovation and led to economies of scale, which reduced the cost of appliances even without accounting for the efficiency gains. For example, the sticker price of appliances has typically fallen by 40% over the last 20 years, while average energy consumption has fallen by a third.
6. Canada	<ul style="list-style-type: none"> ▪ Very active in increasing renewable energy and has a good strategy for energy demand management. ▪ Quite well functioning market.
7. Hong Kong, China	<ul style="list-style-type: none"> ▪ With government assistance in implementation.
8. Chinese Taipei	<ul style="list-style-type: none"> ▪ Significant achievements have been made in improving energy intensity. ▪ Voluntary "Energy Label" program.
9. People's Republic of China	<ul style="list-style-type: none"> ▪ According to the World Bank, China has developed one of the most comprehensive and effective sets of energy efficiency policies and programs in the world. The strength of its efforts has been: (a) good organization; (b) focus on overcoming implementation difficulties at local levels as well as the development of national policies and programs; (c) an effective blending of market-based energy efficiency investment and service mechanisms with new law-based regulations; and (d) investments in institutional development to provide the foundation for long-term gains.
10. Brunei Darussalam	<ul style="list-style-type: none"> ▪ I am not well versed in the rest of the APEC economies' energy policies to select.
11. New Zealand	<ul style="list-style-type: none"> ▪ New Zealand also has an effective energy demand management policy.

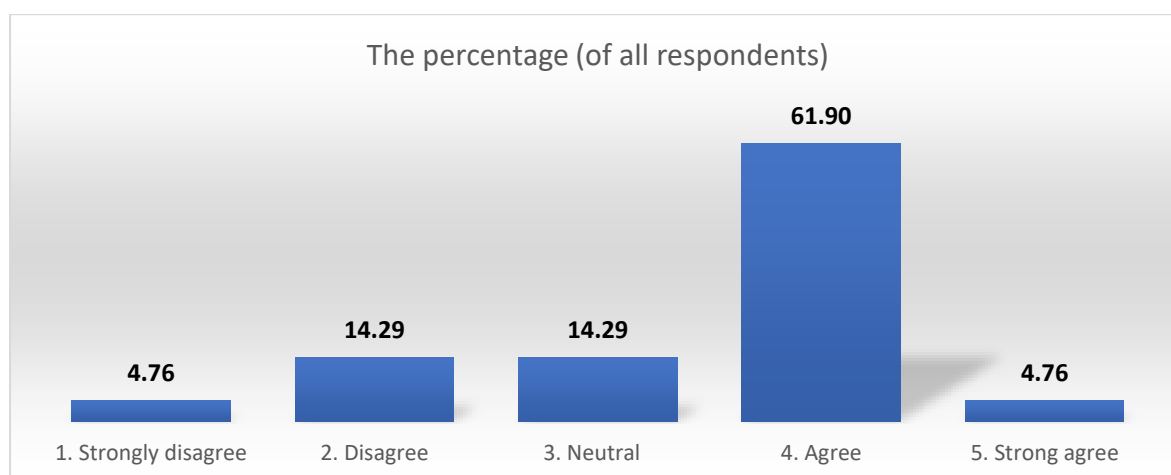
APEC economies	Comments
12. Thailand	<ul style="list-style-type: none"><li data-bbox="571 271 1214 300">▪ With government assistance in implementation.

1.1 Energy Efficiency

Energy efficiency refers to the process of using less energy to perform the same task or achieve the same outcome. It involves adopting technologies, practices, and measures that reduce energy waste while maintaining or enhancing productivity and comfort.

The APEC Expert Group on Energy Efficiency and Conservation (EGEEC) was established by the APEC Energy Working Group (EWG) in 1993 to assist in achieving energy security, advance economic and social well-being, and realize environmental benefits in the Asia-Pacific region through energy conservation and the application of energy-efficiency practices and technologies.

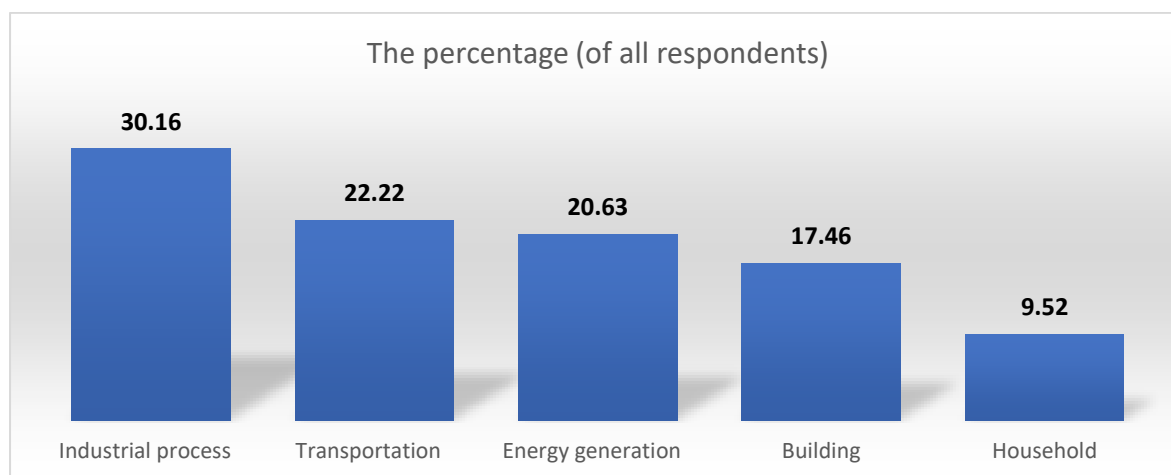
1. Based on your justification, do you agree that the energy efficiency policies within APEC are effectively working towards achieving net-zero emissions?



Level of opinion	Comments
1. Strongly disagree	-
2. Disagree	<ul style="list-style-type: none"> ▪ Governments are more interested in promoting economic growth, with more energy consumption, put little emphases on improving efficiency.
3. Neutral	<ul style="list-style-type: none"> ▪ <i>I am not well versed enough in the EE policies of APEC economies to form an opinion on it.</i> ▪ While APEC's energy efficiency policies are a crucial component in the journey towards net-zero emissions, their effectiveness is contingent on various factors, including the commitment of member economies, the adoption of advanced technologies, and the implementation and enforcement of policies.
4. Agree	<ul style="list-style-type: none"> ▪ Economies are eager to implement the energy efficiency. ▪ The limited energy markets in most of the APEC economies. ▪ Broadly, the policies are supportive of the goal for net-zero. However, the extent of net-zero varies per country. ▪ As long as implemented with other policies. ▪ Most of the member states have establish national energy efficiency improvement goals and energy efficiency label systems. ▪ Many APEC economies have recognized the importance of

Level of opinion	Comments
	<p>addressing climate change and have set targets to reduce emissions. Energy efficiency policies are a crucial component of these efforts, as improving efficiency can lead to lower energy consumption and reduced greenhouse gas emissions.</p> <ul style="list-style-type: none"> ▪ A key highlight of the APEC calls for action is the adoption of a shared goal to reduce energy intensity. Thailand, for example, has incorporated this target into both its past and current Energy efficiency Plans, showcasing its commitment to this common objective.
5. Strong agree	<ul style="list-style-type: none"> ▪ Energy efficiency is a starting concept that should be pursued first.

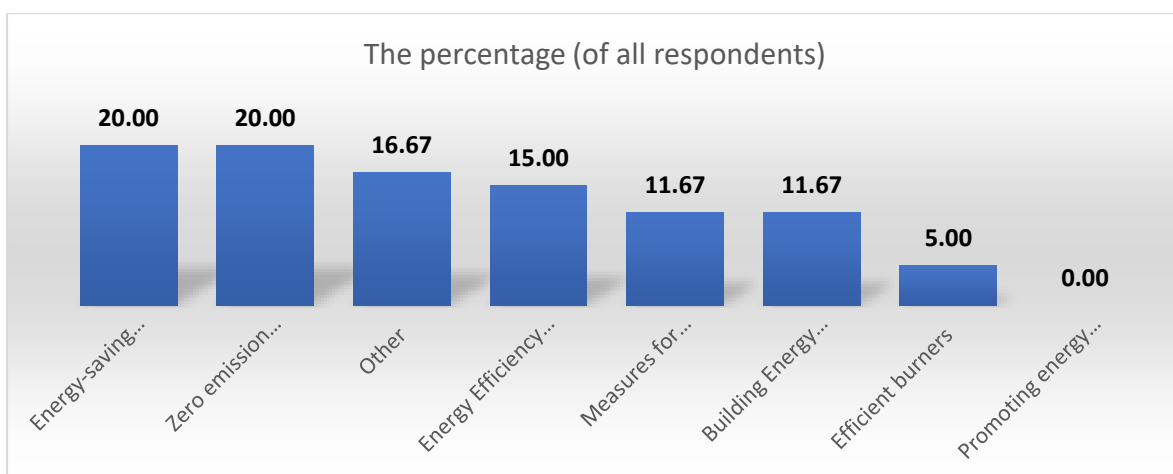
2. On the sectors listed below, please select three sectors based on their prominence of energy efficiency policy towards achieving net-zero emissions.



Sectors	Comments
1. Industrial process	<ul style="list-style-type: none"> ▪ Venting and flaring are also contributing to a lot of GHG emissions. ▪ Industry are using big portion of energy instruments. ▪ More innovations occur in the sector. ▪ It is an important source of meat and has opportunities for development. ▪ Industrial sector is one of the largest scope 1 and 2 GHG emission sectors. ▪ They have more opportunity to explore and utilize technology that would aid in achieving the targets on net-zero. ▪ Largest 3 contributors to GHG emissions. ▪ Most advanced economies within APEC, such as the US, Canada, Australia, Japan, and South Korea, have been successful in promoting energy efficiency in industrial processes. Even PRC China has seen significant success.
2. Transportation	<ul style="list-style-type: none"> ▪ Most countries have adapted in this area and are most easily accessible to citizens. ▪ In our economy specific profile, transport is the only sector with minimal programs on decarbonization. ▪ Mobility is one key component of the modern economy.

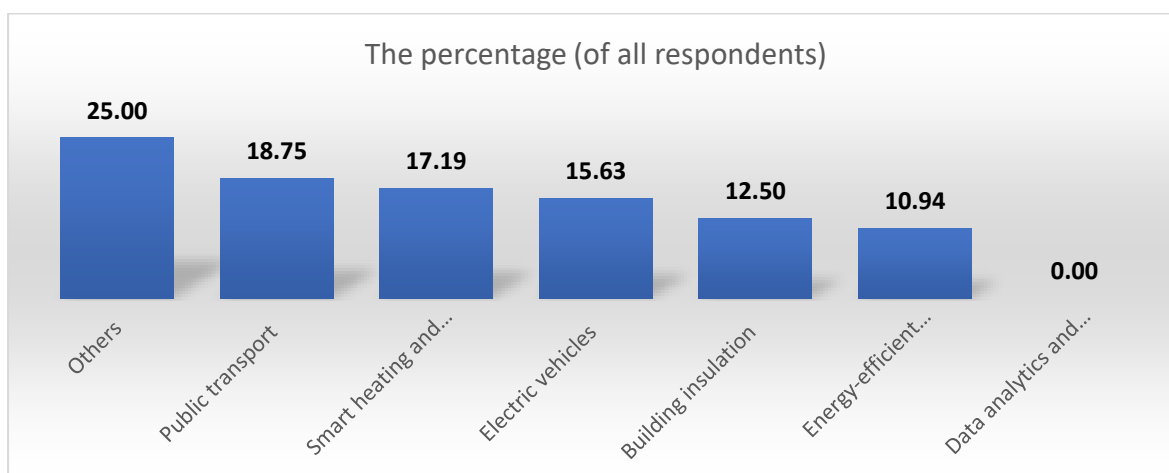
Sectors	Comments
	<ul style="list-style-type: none"> ▪ Electric Vehicles are now a big thing in the region. ▪ Largest 3 contributors to GHG emissions. ▪ A number of APEC member economies are major automakers, and almost all of them have active EV promotion policies in place, e.g., China, Korea, Japan, the US, Thailand, Indonesia, etc.
3. Energy generation	<ul style="list-style-type: none"> ▪ Typically, this is the largest emitter of GHG based on sector. ▪ Energy generation is the most key areas. ▪ More innovations occur in the sector. ▪ Emit the most greenhouse gases. ▪ Energy sectors accounts for 60~70 % of GHG emissions globally and reducing electricity emission coefficient will be vital to reach Net-zero goals. ▪ Most people resist net-zero emission for fearing their personal living standard will be severely cut. Total electrification provides the way to keep people content. ▪ Largest 3 contributors to GHG emissions.
4. Building	<ul style="list-style-type: none"> ▪ Buildings requires a lot of energy during daily operations and there is room for improvement in terms of energy efficiency. ▪ More innovations occur in the sector. ▪ Cooling requirements are big source of energy demand. ▪ Most buildings last 50 or more years. With better building materials and design will save huge amount of energy for a long time. ▪ Commercial and Government Buildings are good drivers of net-zero initiatives.
5. Household	<ul style="list-style-type: none"> ▪ One of the major area for energy consumption is the household. ▪ Cooling requirements are big source of energy demand. ▪ Energy efficiency standards and labeling scheme have been adopted successfully in most APEC economies.

3. Which specific energy efficiency measures within APEC demonstrate a strong commitment to advancing net-zero emissions?



Specific energy efficiency measures	Comments
Energy-saving equipment labeling policy	<ul style="list-style-type: none"> ▪ We need to promote the purchase of energy-efficient electronic products. ▪ Regulation on energy labeling empowers consumers and promotes energy efficiency performance requirements. ▪ Most APEC economies have some form energy efficiency standards and labeling schemes and they have had impacts in changing consumer behavior.
Zero emission vehicles	<ul style="list-style-type: none"> ▪ Most countries have adapted in this area and are most easily accessible to citizens.
Other	-
Energy Efficiency Resource Standard (EERS)	-
Measures for Factory and Building Management and Control	<ul style="list-style-type: none"> ▪ Because it the major use of the energy.
Building Energy Code (BEC)	<ul style="list-style-type: none"> ▪ Space heating and cooling consume a high share of energy. Building energy codes are widely recognized as effective regulatory standards for improving building energy performance within given time frames. Some APEC economies have adopted and implemented comprehensive building energy codes; others may have varying levels of adoption or may be in the process of developing and enhancing their codes. APEC, through its various working groups and initiatives, has been involved in promoting best practices and facilitating knowledge sharing on energy efficiency in buildings.
Efficient burners	-
Promoting energy conservation	<ul style="list-style-type: none"> ▪ Because the industry is the major area for energy consumption. ▪ Create awareness among the people of the country.

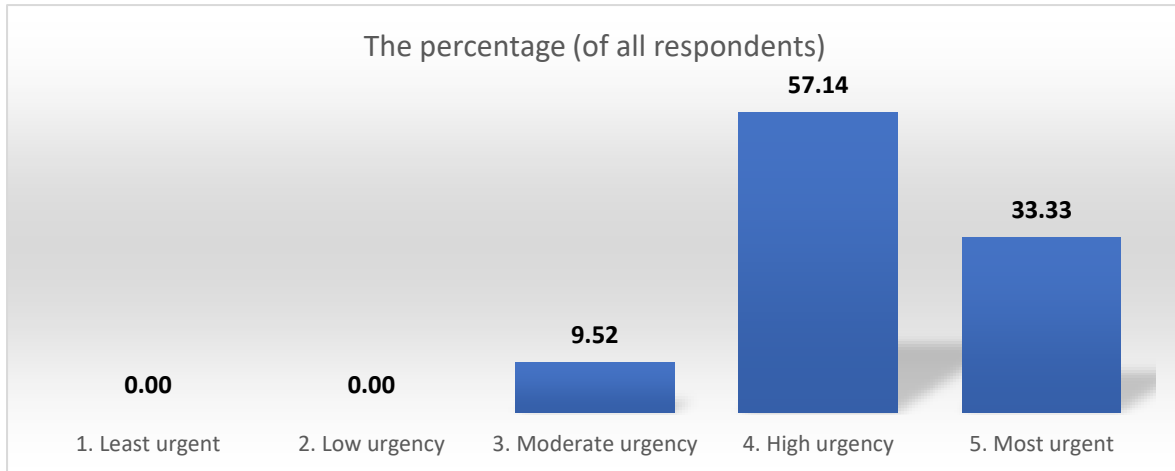
4. What measures should be integrated into energy efficiency policy to accelerate progress towards achieving net-zero emissions?



Measures	Comments
Others	-
Public transport	<ul style="list-style-type: none"> ▪ The important role of the sector. ▪ Reduce the need for individual transport vehicles. ▪ A well-designed public transport system can contribute significantly to reducing GHG emissions, promoting sustainable urban development, and addressing climate change.
Smart heating and cooling systems	<ul style="list-style-type: none"> ▪ This promotes sustainability. ▪ It is very closely related with industry and household energy use. ▪ It is the part that emits the most greenhouse gases. ▪ Climate change and economic development are expected to significantly drive the growth in energy consumption for heating, ventilation, and air conditioning (HVAC) systems. ▪ As pointed out in 3 (BEC) above, heating and cooling consume a substantial portion of global energy demand. With the increasing deployment of data analytics and machine learning, as well as other smart technologies and devices, the operation of heating and cooling systems can be made more efficient.
Electric vehicles	<ul style="list-style-type: none"> ▪ The important role of the sector. ▪ EVs are generally more energy efficient than ICEs and emit less CO₂ (provided that the electricity is sourced from cleaner energy).
Building insulation	<ul style="list-style-type: none"> ▪ This helps in reducing electricity consumption for heating. ▪ Cooling (and heating in some part) needs will increase faster than other sectors in APEC region. Better insulation means more comfortable lives and less energy needs.
Energy-efficient lighting	<ul style="list-style-type: none"> ▪ This promotes sustainability. ▪ Because it is one of major energy use in the buildings. ▪ Lighting represents a significant portion of electricity consumption, and promoting energy-efficient lighting technologies is a cost-effective and impactful way to reduce energy consumption and GHG emissions. Its advantages include, among others, significant savings and the ability to cause market transformation.
Data analytics and machine learning	<ul style="list-style-type: none"> ▪ This promotes sustainability. ▪ We should have the qualified data for the development of the strategy ▪ The important role of the sector. ▪ It should start with analysis. ▪ Comprehensive data collection aids in achieving in-depth energy savings. ▪ These technologies offer several advantages that can enhance the effectiveness of energy efficiency initiatives, e.g., optimizing building energy management systems, providing granular insights

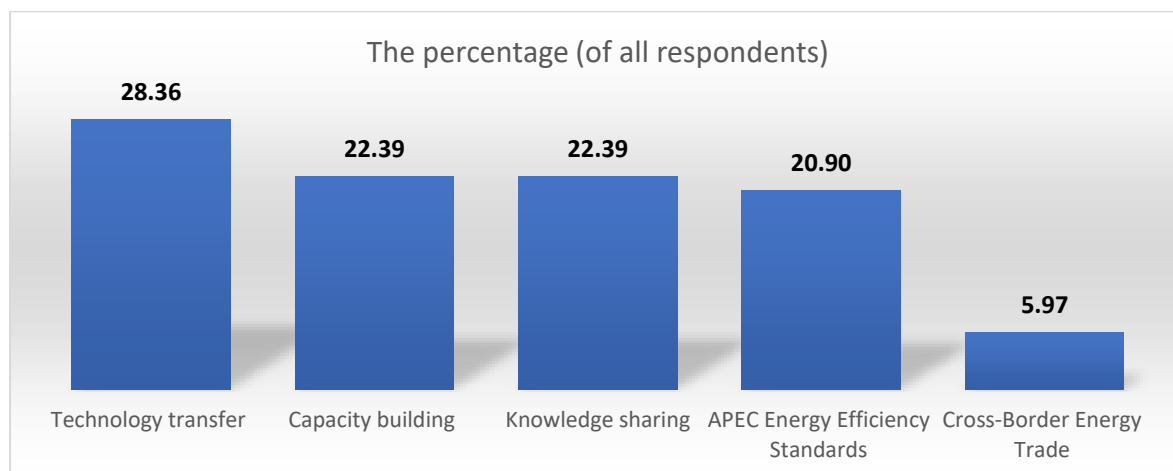
Measures	Comments
	and targeted strategies, offering predictive analytics for demand response, etc., particularly in a smart grid environment.

5. Based on your justification, please indicate the level of urgency for investment in implementing those existing energy efficiency initiatives within APEC towards achieving net-zero emissions.



Level of opinion	Comments
1. Least urgent	-
2. Low urgency	-
3. Moderate urgency	<ul style="list-style-type: none"> Although existing energy efficiency initiatives are the first thing that should be done, changing technology to transition to low emits or non-emits are something that should be accelerated.
4. High urgency	<ul style="list-style-type: none"> Because there are strong demands from economies. Improving energy efficiency requires substantial investment, and the current scale is challenging to achieve net-zero. Energy efficiency is a low-hanging fruit; its measures are less expensive and take a shorter time to implement.
5. Most urgent	<ul style="list-style-type: none"> Energy efficiency is low-hanging fruits that can easily be tackled. Equal resources should be provided to energy efficiency intervention like those in renewable energy.

6. Please identify the collaboration among APEC economies regarding energy efficiency are driving progress towards net-zero emissions.



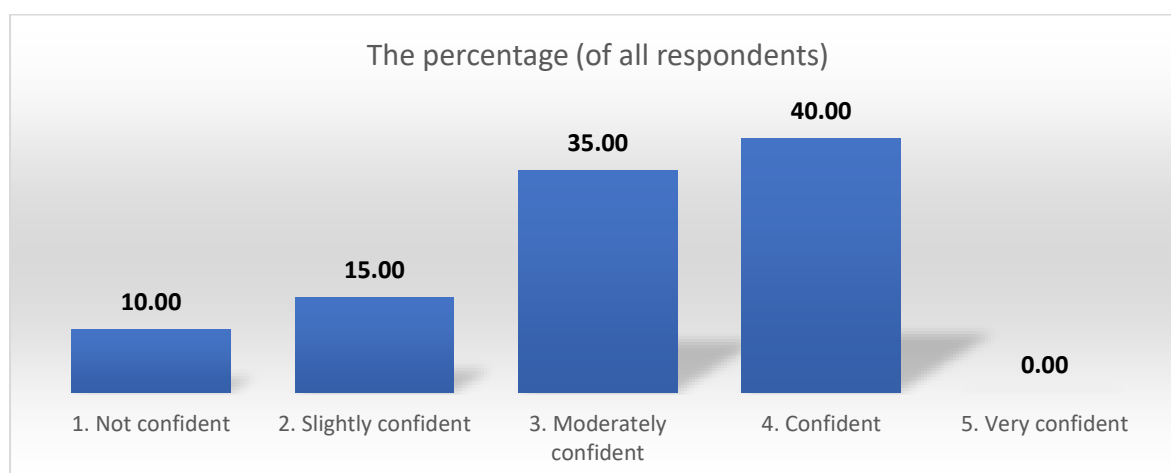
the collaboration among APEC economies	Comments
Technology transfer	<ul style="list-style-type: none"> ▪ Sometimes a country is lacking in technology to be developed and deployed. ▪ It is a practical way to implement. ▪ Technology transfer will contribute to the market penetration of high-efficiency products. ▪ Developing economies generally lack access to the best available technologies for energy efficiency.
Capacity building	<ul style="list-style-type: none"> ▪ Lack of capacity. ▪ Training and sharing of best practices enable other economies to skip the learning curve and deploy proven solutions. ▪ Developing economies generally lack the institutional and human capacity to plan and implement energy efficiency initiatives.
Knowledge sharing	<ul style="list-style-type: none"> ▪ This, in addition to knowledge application and implementation. ▪ Energy conservation promotion involves diverse approaches, and knowledge sharing facilitates mutual learning. ▪ In many cases of energy efficiency enhancement, there is no need to "re-invent the wheel."
APEC Energy Efficiency Standards	<ul style="list-style-type: none"> ▪ Perhaps this is useful tool to ensure that the standards are consistent across APEC economies. ▪ Equipment efficiency Standards effectively prevent the entry of low-efficiency products into the market." ▪ Sharing and adopting Energy Efficiency Standards (EES) among APEC member economies play a significant role in promoting sustainable practices, reducing energy consumption, and contributing to global efforts to mitigate climate change. Key aspects include harmonization of standards, technology transfer, and best practices capacity, market transformation, economic benefits, etc.
Cross-Border Energy Trade	-

1.2 Energy Intensity

Energy intensity refers to the amount of energy required to produce a unit of output, such as economic output (GDP), industrial production, or other measurable indicators. It is a metric used to assess the efficiency of energy use in relation to economic or productive activities. Lower energy intensity indicates a more efficient use of energy resources.

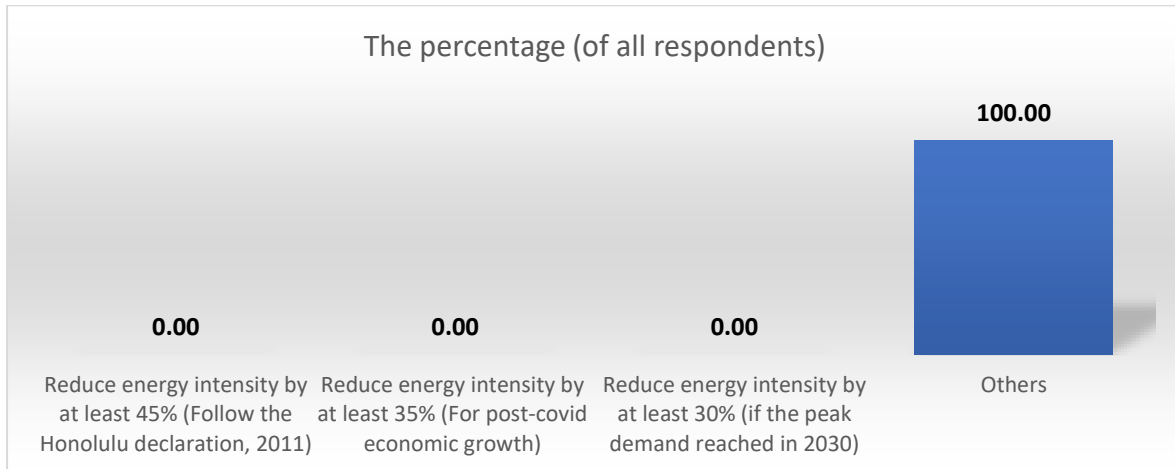
In 2007, APEC Leaders proposed a regional goal to reduce energy intensity by at least 25 percent by 2030. In 2011, APEC Leaders set a higher target to reduce energy intensity by at least 45 percent by 2035 (Honolulu Declaration).

1. How confident do you perceive the energy intensity policies within APEC as being on track with the net-zero emission goals?



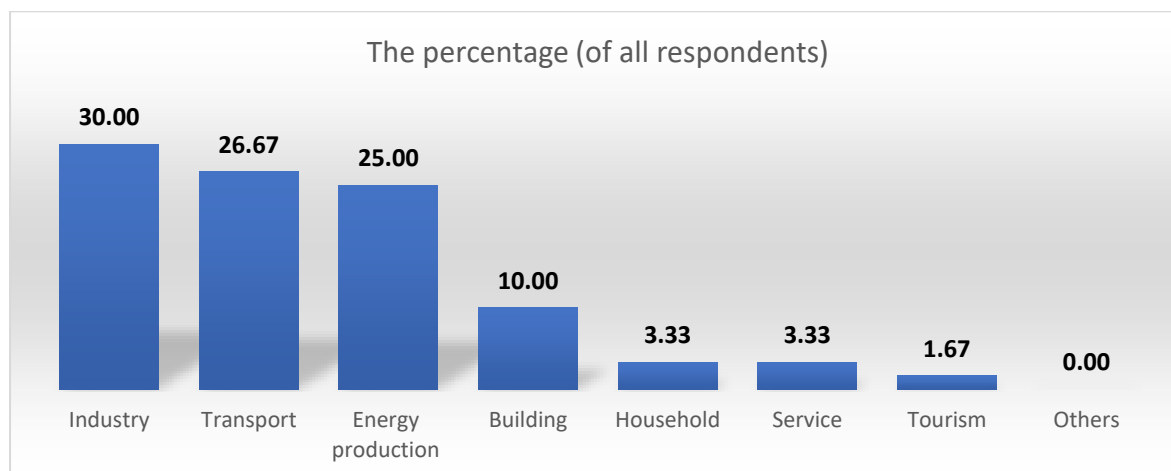
Level of opinion	Comments
1. Not confident	<ul style="list-style-type: none"> Energy intensity trivialize the huge difference and complexity among industries. It can serve as a domestic indicator, but not suitable for comparison. It also may be used to evade the true emission reduction.
2. Slightly confident	<ul style="list-style-type: none"> Energy intensity is a way to check energy efficiency but may not help reduce greenhouse gas emissions if overall production increases more than. I believe most if not all of the member economies of APEC are Parties of the Paris Agreement hence have their respective reduction of greenhouse gas targets that leads to low-carbon or net-zero emission pathways.
3. Moderately confident	<ul style="list-style-type: none"> Many economies are not on track. Varying levels of implementation across the economies.
4. Confident	<ul style="list-style-type: none"> Strong demand from Society. According to the APEC Energy Demand and Supply Outlook (2022), energy intensity has been improving at an average annual rate of 1.9% since 2005, or cumulatively at 22 percent from 2005 to 2018. In the current scenario, APEC will reach its goal of reducing energy intensity in 2034, provided the existing trends in technology development and deployment and current government programs and policies continue.
5. Very confident	-

2. What specific energy consumption targets should APEC agree upon for the approaching year 2035, in relation to achieving net-zero emissions?



Energy consumption targets	Comments
Reduce energy intensity by at least 45% (Follow the Honolulu declaration, 2011)	<ul style="list-style-type: none"> ▪ We need to be more aggressive. ▪ IPCC suggests the world needs to cut its emissions from 2019 levels by as much as 43% by 2030, 60% by 2035 and reach net zero by 2050.
Reduce energy intensity by at least 35% (For post-covid economic growth)	-
Reduce energy intensity by at least 30% (if the peak demand reached in 2030)	<ul style="list-style-type: none"> ▪ This target reflects the updated circumstance. ▪ not sure.
Others <ul style="list-style-type: none"> ▪ No target fit ▪ At least 50% 	<ul style="list-style-type: none"> ▪ APEC countries are on different stages of development; therefore, the energy intensity target is not fit for all. ▪ Since the 45% target is expected to be reached, and considering the urgency of climate change, it is natural to be more ambitious.

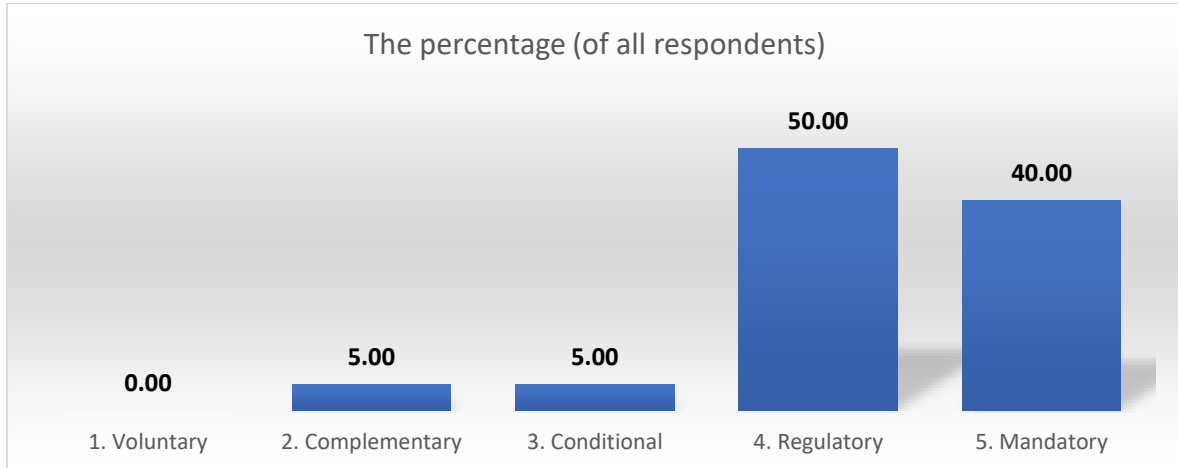
3. On the sectors listed below, please select three sectors based on their prominence of energy intensity policy to achieve net-zero emissions.



Sector	Comments
Industry	<ul style="list-style-type: none"> ▪ High energy demand. ▪ It is an important source of meat and has opportunities for development. ▪ Most countries are interested in promoting economic growth with higher industrial output. Energy intensity targets may be able to lower emission growth. ▪ For emission-intensive industries. ▪ According to the APEC Energy Demand and Supply Outlook (2022), industrial energy use increases at a slower rate than output due to energy efficiency improvements. And industrial energy use accounts for more than 30% of the total, making it the largest energy consumer.
Transport	<ul style="list-style-type: none"> ▪ High energy demand. ▪ Most countries have adapted in this area and are most easily accessible to citizens. ▪ Electrification. ▪ The transport sector is currently the second-largest energy-consuming sector. But in future, it is expected to drop drastically, mostly due to widespread electrification.
Energy production	<ul style="list-style-type: none"> ▪ High energy demand. ▪ Emit the most greenhouse gases. ▪ Renewable energy. ▪ Energy production that comes from non-renewable sources can be energy intensive.
Building	<ul style="list-style-type: none"> ▪ Efficient cooling. ▪ The building sector is the third-largest energy consumer and has been growing rapidly, particularly in Southeast Asia. However, appliance energy efficiency improvements, the implementation of stricter building codes, and the application of data-driven energy management are expected to play a key role in reducing energy consumption in this sector.
Household	<ul style="list-style-type: none"> ▪ Residential areas if there is high and inefficient consumption of energy.
Service	-

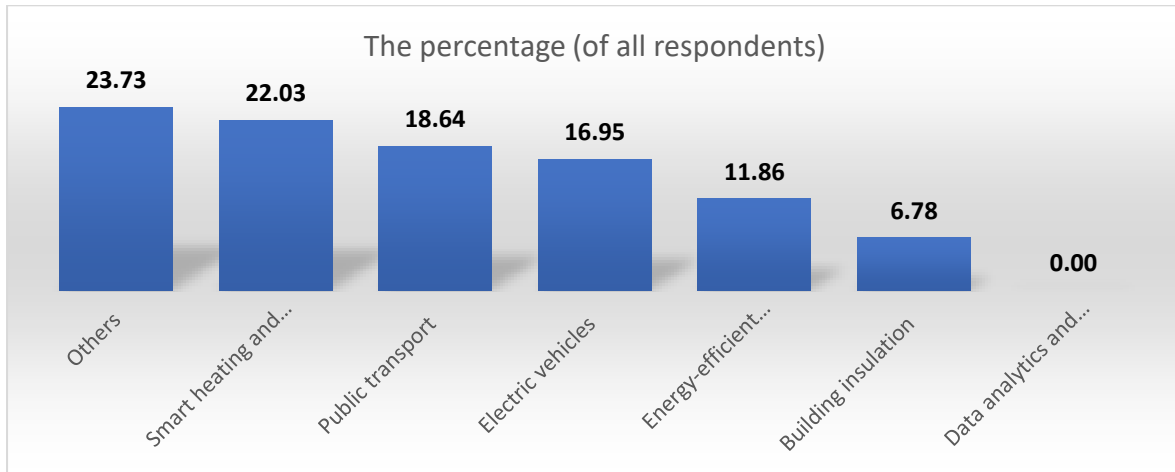
Sector	Comments
Tourism	-
Others	-

4. On a scale of 1 to 5, how strong should regulations be applied to reduce energy intensity, in alignment with achieving net-zero emissions?



Level of regulations	Comments
1. Voluntary	-
2. Complementary	-
3. Conditional	-
4. Regulatory	<ul style="list-style-type: none"> ▪ It is very urgent to move and ack rather discuss and debate. ▪ I am not so sure with my answer but i feel like if member economies are serious about tackling the issue of climate change, more stringent measures have to be put in place but at the same time the measures must not compromise the wellbeing and economic development of the country.
5. Mandatory	<ul style="list-style-type: none"> ▪ We need much stronger regulation. ▪ Anything short of mandatory lessens the effectivity. ▪ In view of the urgency of achieving net-zero emissions, it is necessary to make some regulations mandatory.

5. Based on your justification, which technologies have strong impact on energy intensity, to accelerate progress towards achieving net-zero emissions?

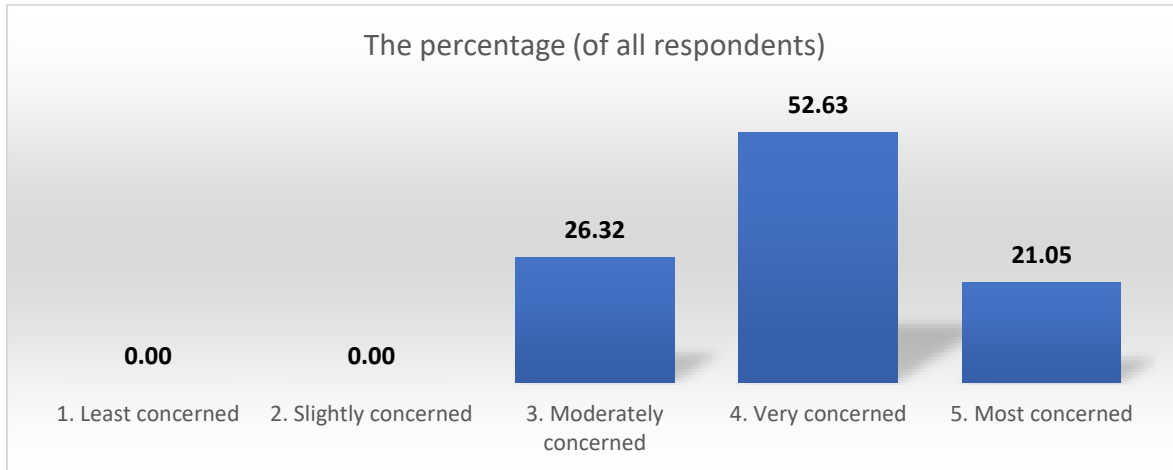


Technologies	Comments
Others	-
Smart heating and cooling systems	<ul style="list-style-type: none"> ▪ High usage. ▪ It is the part that emits the most greenhouse gases. ▪ More on efficient cooling. ▪ <i>See previous answer.</i>
Public transport	<ul style="list-style-type: none"> ▪ High usage. ▪ Easily measure results. ▪ Less private cars on the road. If public transport has zero emissions, it will be better. less fuel consumption ▪ <i>See previous answer.</i>
Electric vehicles	<ul style="list-style-type: none"> ▪ High usage. ▪ Easily measure results. ▪ <i>See previous answer.</i>
Energy-efficient lighting	<ul style="list-style-type: none"> ▪ Solar lights can significantly reduce energy consumption too. ▪ <i>See previous answer.</i>
Building insulation	-
Data analytics and machine learning	<ul style="list-style-type: none"> ▪ <i>See previous answer.</i>

1.3 Electricity Demand

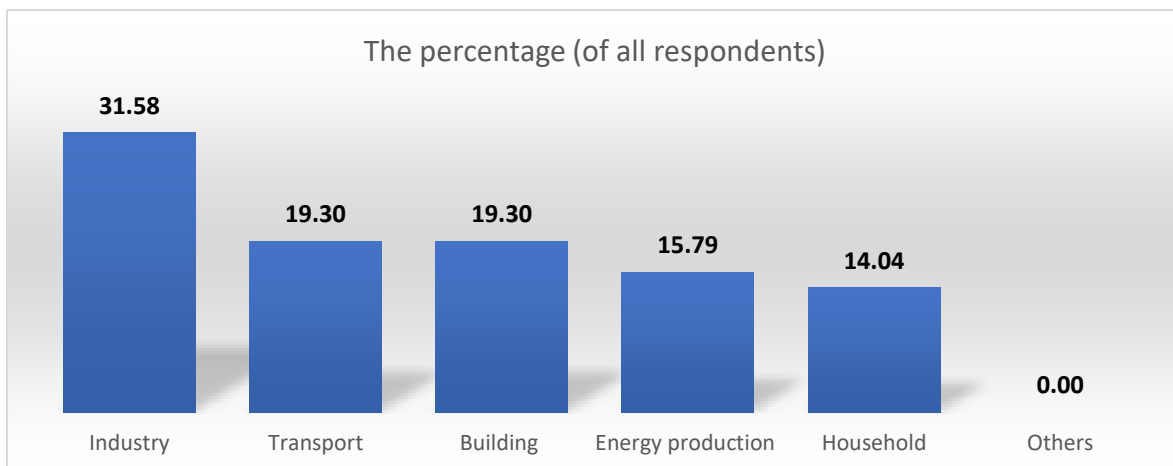
Electricity demand refers to the quantity of electrical energy required by consumers, businesses, industries, and other entities within a timeframe.

1. On a scale of 1 to 5, how concerned are you on the potential increase in electricity demand as the dominant form of energy in which APEC economies are working towards achieving net-zero emissions?



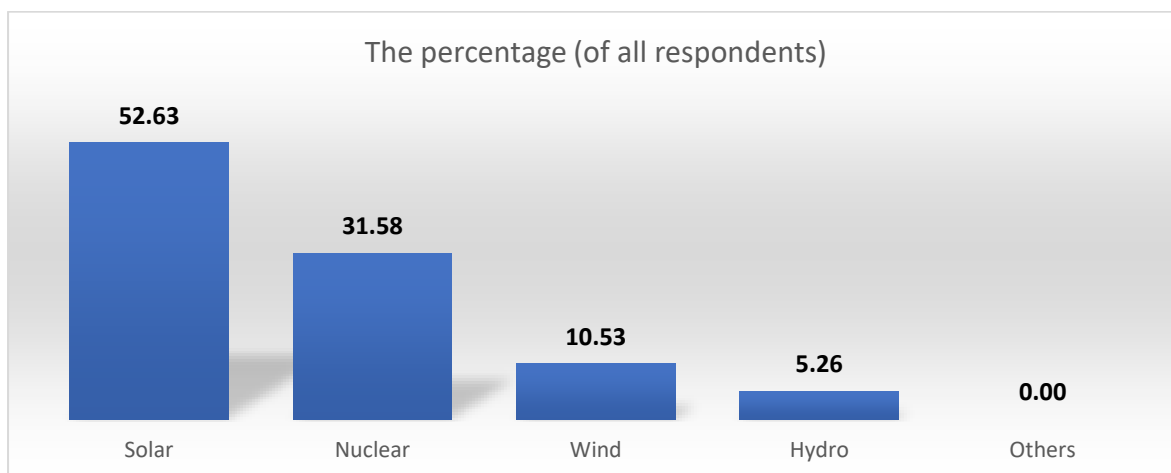
Level of opinion	Comments
1. Least concerned	-
2. Slightly concerned	-
3. Moderately concerned	<ul style="list-style-type: none"> More offset measures have to be put in place to balance out the emissions.
4. Very concerned	<ul style="list-style-type: none"> Our economy could not afford the same energy demand trajectory of the more developed economies.
5. Most concerned	<ul style="list-style-type: none"> Energy sector shows highest demand. Electricity Demand is increasing demands in the sector.

2. On the sectors listed below, please select three sectors based on their important in electricity demand.



Sector	Comments
Industry	<ul style="list-style-type: none"> High usage. As it expands, consumption has to be efficient Industries need electricity.
Transport	<ul style="list-style-type: none"> High usage. There is a need to transition the fuel source of the sector to be more sustainable.
Building	<ul style="list-style-type: none"> Electricity demand for cooling is accelerating. Buildings need electricity.
Energy production	<ul style="list-style-type: none"> High usage.
Household	<ul style="list-style-type: none"> Residential areas need electricity.
Others	-

3. Please select the alternative source of electricity which would have the greatest impact on electricity demand in APEC economies to accelerate progress towards achieving net-zero emissions?



the alternative source of electricity	Comments
Solar	<ul style="list-style-type: none"> Consistent supply of solar energy. For Brunei, this is the most viable option.
Nuclear	<ul style="list-style-type: none"> It is the energy that provides the most efficiency for the price, but safety in use may have to be considered. It's baseload characteristic is a match for our economy's electricity requirements.
Wind	-
Hydro	-
Others	-
