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# ENERGY RETREAT

## Developing a Roadmap to CAP's Future

***CAP Energy Portfolio – Post NGS***

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# Goals of a diversified portfolio

- **Diversification Definition:**
  - made up of many differing parts that are very different or distinct from one another
- **Challenge**
  - The sources of electricity are long-term capital intensive assets that require long term obligations from buyers
- **Goal is to have many eggs in our basket**
- **Rule of Thumb: No single source greater than 15-20% of the load**
  - Load in this context is defined as the MW required to meet CAP's base load pumping requirements in each hour

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# Historical fuel diversity in the US

**According the US Energy Information Administration, the following sources supplied electricity to the US in 2012 :**

- Coal 37%
- Natural Gas 30%
- Nuclear 19%
- Hydropower 7%
- Other Renewable 5%
  - Biomass 1.42%
  - Geothermal 0.41%
  - Solar 0.11%
  - Wind 3.46%
- Petroleum 1%
- Other Gases < 1%

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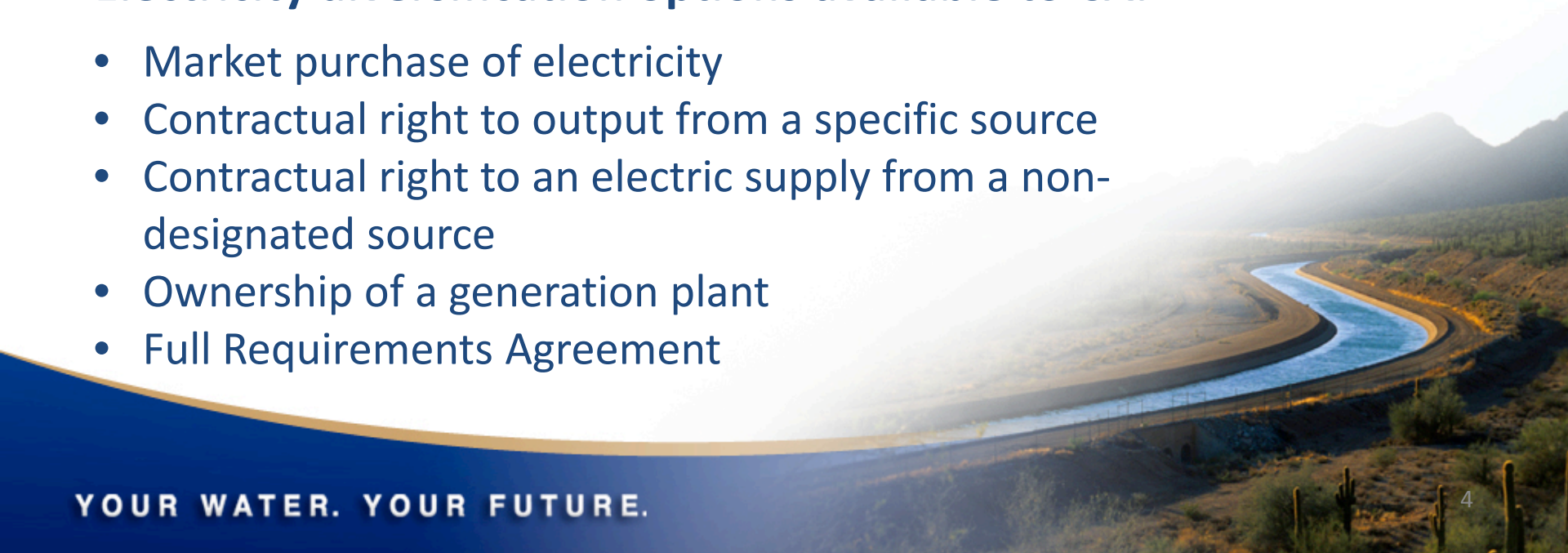
# Electricity diversification options available to CAP

**The following options are for illustrative purposes and are not inclusive of all the options**

**The options are not fuel source specific**

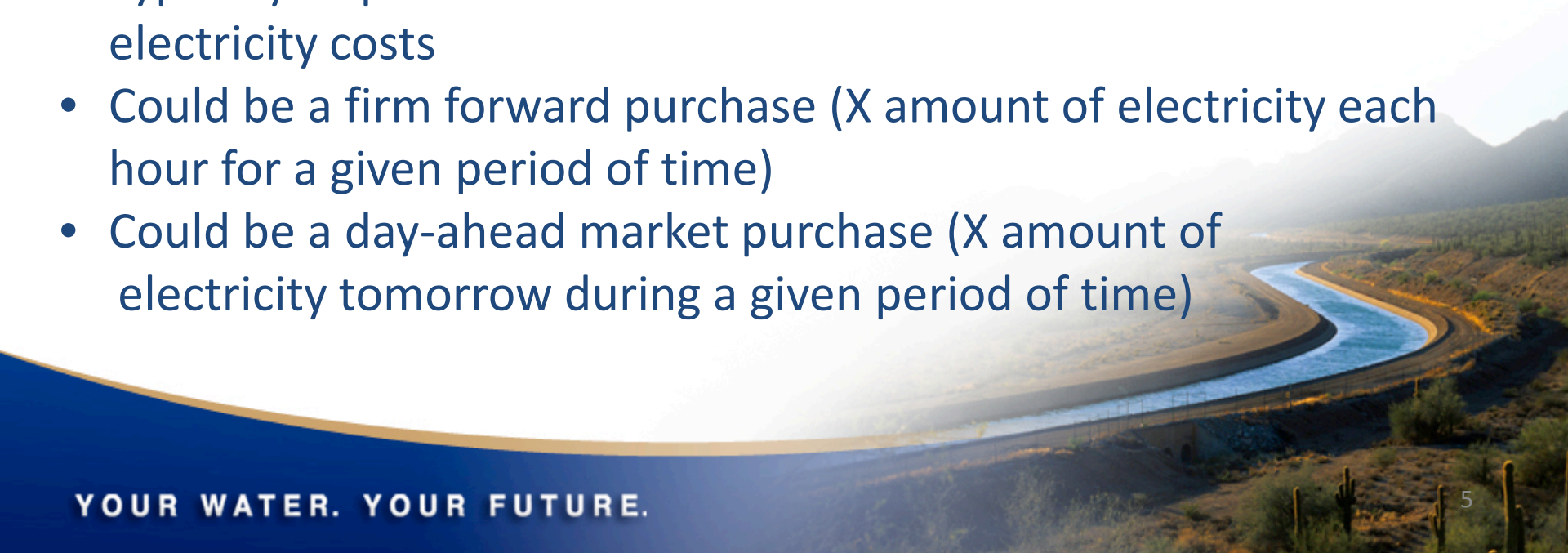
**Electricity diversification options available to CAP**

- Market purchase of electricity
- Contractual right to output from a specific source
- Contractual right to an electric supply from a non-designated source
- Ownership of a generation plant
- Full Requirements Agreement



# Market Purchase of Electricity

- The majority of this component would be near-term market < one year
- Difficult to procure as there isn't a long-range liquid market in the southwest
- Typically less expensive as suppliers don’t have forward risks to cover
- Typically requires a rate stabilization fund to ensure level electricity costs
- Could be a firm forward purchase (X amount of electricity each hour for a given period of time)
- Could be a day-ahead market purchase (X amount of electricity tomorrow during a given period of time)



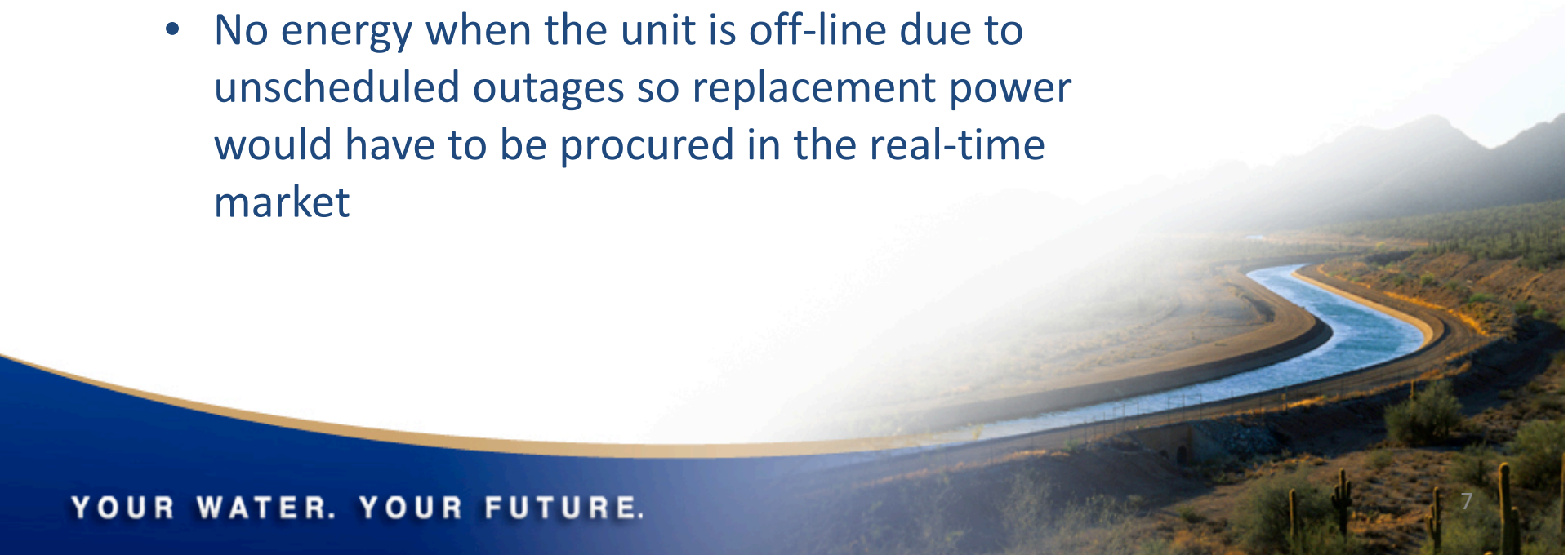
# Contractual instrument to deliver electricity

## Purchase Power Agreement

A Purchase Power Agreement (PPA) is the typical instrument used in the electricity market. It is a contract between two parties, one who generates electricity for the purpose (the seller) and one who is looking to purchase electricity (the buyer). The PPA defines all of the commercial terms for the sale of electricity between the two parties, including when the project will begin commercial operation (if new), schedule for delivery of electricity, penalties for under delivery, payment terms, and termination.

# Contractual right to an existing generation plant

- **PPA – Unit entitlement (Tolling Arrangement)**
  - Would not require a capital investment
  - No operational challenges or expenses
  - If applicable CAP could institute a fuel supply hedging strategy to control some of the fuel risks, more portfolio diversification decisions
  - No energy when the unit is off-line due to unscheduled outages so replacement power would have to be procured in the real-time market



# Contractual right to an electricity supply from a non-designated source

**The following are two examples that are common in the industry, generation owners have other examples and they can be creative in implementing deals**

- **PPA – Energy**
  - Firm energy price
    - Due to the lack of suppler hedging options, this alternative could be difficult to procure for a term greater than one year
    - Could be used for some of the shoulder months, especially off-peak

# Contractual right to an electricity supply from a non-designated source

- **PPA – Cost plus fuel**
  - The supplier would have the contractual obligation to provide electricity based on the cost of the fuel and a predetermined heat rate (generator efficiency) from any source in its portfolio, essentially it is a heat-rate purchase
  - This energy source could be scheduled into the portfolio as fill-in for our shoulder pumping schedule
  - Costs would be subject to ROI and if applicable, CAP would have minimal if any hedging options for fuel
  - The costs could be attractive as a portion of CAP demand is typical off-season/off-peak and would allow the generators to increase their operational capacity factor which would ultimately contribute funds to their fixed costs

# Ownership of a generation plant

- **Build new generation source**
  - CAWCD could be the sole owner
  - CAWCD could partner with others
- **Purchase a portion of an existing generation facility**
  - As seen by the WECC table below there is excess generation in this region (The WECC minimum reserve margin is 13.5%)

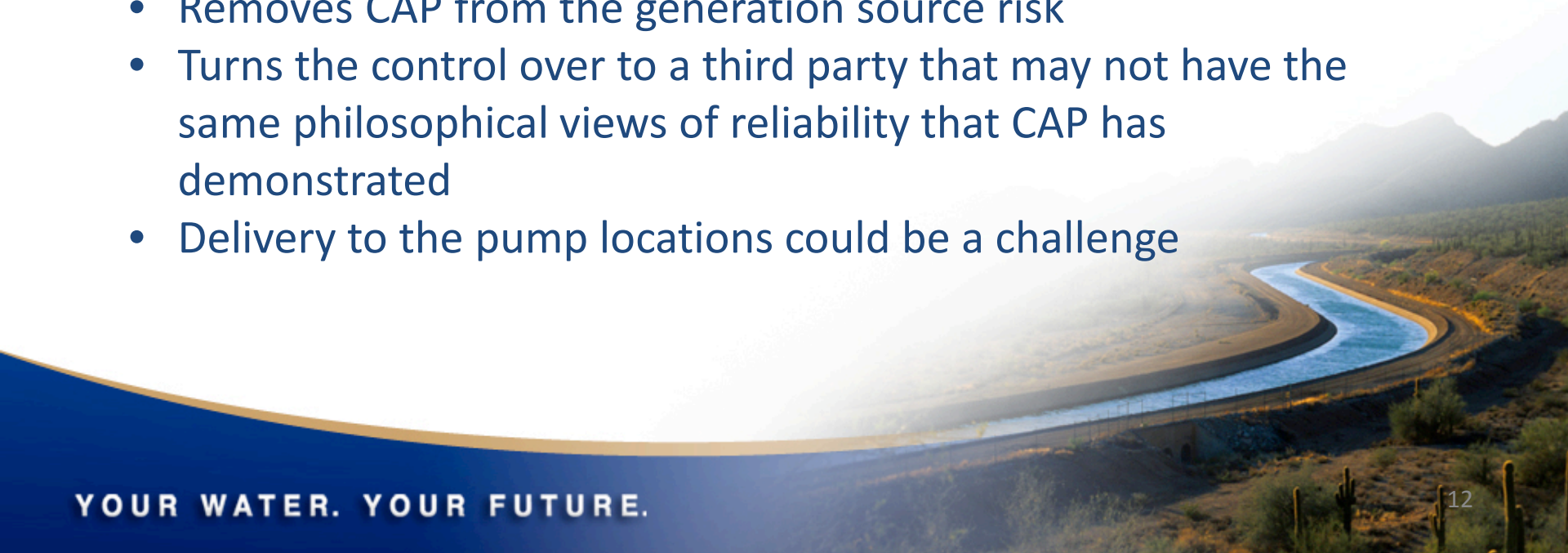
| WECC- DSW Summer | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Anticipated Reserves | 46.57% | 43.51% | 45.69% | 47.93% | 47.03% |
| WECC- DSW Summer | 2018 | 2019 | 2020 | 2021 | 2022 |
| Anticipated Reserves | 46.07% | 41.56% | 34.72% | 29.52% | 29.09% |

# Ownership of a generation plant

- Due to the fixed capital repayment and O&M fees this type of generation would be a base load source
- Energy rate would be lower as there is no ROI incorporated into the rates
- In a new build scenario the plant location could be near CAP load, saving transmission issues
- If partnering, CAP would have to be confident that the partner is financially stable and have the same philosophical agenda related to operation and maintenance

# Full Requirements Agreement

- **Contract with a third party to deliver all of the energy needs of the CAP**
  - Would require a stable and financially solvent partner that has the demonstrated ability to deliver the energy
  - May require a long term commitment, depending on the partner's current fleet of generation
  - Removes CAP from the generation source risk
  - Turns the control over to a third party that may not have the same philosophical views of reliability that CAP has demonstrated
  - Delivery to the pump locations could be a challenge



# General PPA Cost Components of any Generation Source

- **Capacity payment**
  - Debt service payment
  - ROI payment
  - Payment required regardless of electricity delivery
- **Fixed Operation and Maintenance**
  - Costs for having the generator available
  - Labor
  - Infrastructure
  - Spare parts
  - Time based maintenance
  - *Peak Reliability* (formally WECC) compliance

# General Cost Components of any Generation Source

- **Variable O&M**
  - Other costs experienced for operation such as supplies and labor
- **Start Charge (if applicable)**
  - Pre-payment for future overhaul and additional start costs
- **Fuel Cost (if applicable)**
  - A fuel manager would be required to minimize risk and determine day-to-day operations
  - Associated volatility

# Major considerations

## Equity position in generation units

- Will require large capital investment
- Expose CAP to major maintenance expenses
- CAP could be exposed to increased operational expenses as the plant ages, such as increased heat rate or outages
- Scalable
- Provides a price cap
- CAP scheduling rights
- No additional fees for Return on Investment
- May require fuel hedging strategy
- A new source could be built near the load centers which would save transmission costs

# Major considerations

## Purchase Power Agreements

- No capital expenditure
- No development or major maintenance risk
- Must have a reliable and stable partner with similar long range goals
- Scalable
- Unit contingent agreements will have exposure to lost energy replacement
- Firm energy delivery would not be subject to unit outages
- Would pay ROI to the supplier
- May require fuel hedging strategy

# Sample Portfolio

**This is a Sample of what the CAP portfolio may look like; it is NOT intended to be representative of a final portfolio.**

| Item # | Portfolio MWh ratio | Max MW (ratio) | Term Length | Source |
|---|---|---|---|---|
| 1 | X% | Up to X% | Up to one year in advance | Forward or Day-Ahead Purchase |
| 2 | X% | X (X%) | 30 years | Build/buy generation |
| 3 | X% | X (X%) | 30 years | Unit equity |
| 4 | X% | X (X%) | 20 years | Unit equity |
| 5 | X% | X (X%) | 15 years | PPA – Unit entitlement |
| 6 | X% | X (X%) | 10 years | PPA – Unit entitlement |
| 7 | X% | X (X%) | 5 years | PPA – Cost plus fuel |

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# Questions?