## First period 2019-2024 (1 of 3)

First decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Decommissioning El Zapotillo** | **El Zapotillo Dam 60 m** | **El Zapotillo Dam 80 m** | **El Zapotillo Dam 105 m** |
| ../Images/Dam%20decommission.jpg | ../Images/Zapotillo%2060m(2).jpeg | ../Images/Zapotillo%2080m.jpeg | ../Images/Zapotillo%20105m.jpg |
| **Storage** | n/a | 146 Million m3 | 411 Million m3 | 990 Million m3 |
| **Minimum storage** | n/a | 58.3 Million m3 | 58.3 Million m3 | 58.3 Million m3 |
| **Situation of Temacapulín Acasico y Palmarejo** | Communities are spared | Communities are spared | 2 communities are flooded while one needs a 10 m dikes | All communities are flooded |
| **Cost** | 900 million USD + dam decommission | 900 million USD | 900 million USD + cost of dikes | 900 million USD + raising the dam 20 meters more (200 million USD) |

## First period 2019-2024 (2 of 3)

Second decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Cancel water transfer to León** | **Water transfer to León** | **Allocate water as originally intended** | **Allocate water as UNOPS intended (13% less)** |
| ../Images/cancelacion%20acueducto.jpg | ../Images/cancelacion%20acueducto2.jpg | ../Images/acuerdos%20actuales%20de%20distribucion.jpg | ../Images/unops.jpeg |
| **Water allocation (%)** | **Guadalajara** (63.7%)  **Los** **Altos** (36.3%) | 100% para León[[1]](#footnote-1) | **León** 44.1% 2  **Guadalajara** 34.8%  **Los Altos** 20.9% | **León** 44.1% 3  **Guadalajara** 34.8%  **Los Altos** 20.9% |
| **Water allocation (volume)** | **105 m dam**: Guadalajara 5.48, Los Altos 3.1  **80 m dam**: Guadalajara 3, Los Altos 1.8  **60 m dam**: Guadalajara 1.07, Los Altos 0.61 | **80 m o 105 m dam**:  119 million m3  **60 m dam**: 52,980,480 m3 | **105 m**: León 3.8, Guadalajara 3, Los Altos 1.8  **80 m Dam**: León 2.12, Guadalajara 1.67, Los Altos 1  **60 m Dam**: León 0.75, Guadalajara 0.59, Los Altos 0.35 | **León** 3.31 m³/s,  **Guadalajara** 2.61 m³/s,  **Los Altos** 1.56 m³/s |
| **Additional Cost** | El Purgatorio Dam 500 million USD | Construction of Aqueduct aprox. 450 million USD | El Purgatorio + Aqueduct aprox 950 million USD | El Purgatorio + Aqueduct aprox 950 million USD |
| **Annual operation & management cost** | Dam El Purgatorio = 43 million USD | Aqueduct = 16 million USD | Both = 59 million USD | Both = 59 million USD |
| **Cost per million m3 including el Zapotillo Dam** | **105 m Dam**:  7 million USD  **80 m Dam**:  13 million USD  **60 m Dam**:  36 million USD | **80 m Dam**:  15 million USD  **60 m Dam**:  36 million USD | **105 m Dam**:  8 million USD  **80 m Dam**:  15 million USD  **60 m Dam**:  45 million USD | **105 m Dam**:  10 million USD  **80 m Dam**:  18 million USD  **60 m Dam**:  52 million USD |

## First period 2019-2024 (3 de 3)

Third decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Increasing water price 15% yearly** | **Increasing water price 10% yearly** | **Increasing water price 5% yearly** | **Implement water saving devices** |
|  | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.08.31.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.31.11.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.13.04.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-05%2012.05.51.png |
| Current prices per m3 | **SIAPA (Guadalajara)**: Base tariff 2.5 USD per 6 m3 + 0.9 USD per additional m3  **SAPAL** (**León)**: Base tariff 123.99 + block tariff per m3 0.3 – 1.0 USD per 1 m3 until 20 m3 | | | **Potential saving:**  20% of total demand |
| Yearly income of water utilities | **SIAPA**: 180 million USD  **SAPAL**: 113 million USD | | | **What does it consist of?**  Economically encourage water users to implement water saving devices for homes, and prohibit the sale of new equipment that does not have water saving technology |
| Yearly Price increase | **SIAPA:** 20% for 2018, y 22% for 2019  **SAPAL:** 12.5% average since 2006 | | |
| Financial balance | **SIAPA:** Income 3,424,291,052 – Costs 3,234,082,324 – Debt payments 190,377,676 Balance = 0  **SAPAL:** income 2,031,014,324 – Costs 2,031,014,324 + investments Zapotillo 540,987,277 Balance = 540,987,277 | | |
| Cost of production per m3 | **SIAPA:** 0.9 USD per m3  **SAPAL:** 1.2 USD per m3 | | | **How would it be implemented?**  For each purchase and installation of a saving device, 50% of its cost on the water bill would be deducted**. Estimated cost** 25 USD per household. **GDL**: 25 million USD, **León**: 11 million USD |
| Change in yearly income of water utilities | **SIAPA:** 27million USD  **SAPAL:** 16 million USD | **SIAPA:** 18 million USD  **SAPAL:** 11 million USD | **SIAPA:** 9 million USD  **SAPAL:** 5 million USD |
| Second round money balance | **SIAPA:** 131 million USD  **SAPAL:** 105 million USD | **SIAPA:** 90 million USD  **SAPAL:** 81 million USD | **SIAPA:** 856,115,000  **SAPAL:** 55 million USD |

## Second period 2024-2029 (1 0f 3)

First decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Prioritize ecological flows** | **Increasing water price 15% yearly** | **Increasing water price 10% yearly** | **Implement water saving devices** |
| ../Images/environmental%20flows.jpg | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.08.31.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.31.11.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-05%2012.05.51.png |
| What is it about? | To calculate the ecological flow we rely on the Mexican Standard NMX-AA-159-SCFI-2012 (normative appendix D), for the period of drainage, and the Quick Guide for the determination of ecological flows (Salinas Rodriguez, 2011) for wet season This condition will force the ecological flow to meet the detriment of the demand for water to El Purgatorio. | The information will depend on the decisions made in the previous period. | The information will depend on the decisions made in the previous period. | **Potential Savings:**  20% of the total demand that reaches the houses**.**  **What does it consist of?**  Economically encourage water users to implement water saving devices for homes, and prohibit the sale of new equipment that does not have water saving technology |

## Second period 2024-2029 (2 de 3)

Second decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Reducing physical losses from current yearly rate 0.23% - Guadalajara, y 0.9% - León to a 5% yearly** | **Rainwater harvesting** | **Water reclamation** | **Stormwater harvesting** |
| ../Images/Fixing%20pipes.jpg | ../Images/Cosecha%20de%20agua%20de%20lluvia.jpeg | ../Images/Agua%20reciclada.jpg | ../Images/Captura%20de%20agua%20de%20tormenta.png |
| **Cost** | **Guadalajara**: 15 million USD/km  **León**: 3 million USD/km  (The cost of repairing pipes in Guadalajara is almost 6 times higher than in León) | **Guadalajara**: 15 million USD/Mm3  **León**: 22 million USD/Mm3 | **León**: 157,000 USD/Mm3  **Guadalajara**: 79,000 USD/Mm3 (Agua Prieta y El ahogado) | **Guadalajara**: 4.5 million USD//Mm3  **León**: 4.5 million USD//Mm3  (The cost may increase due to the need to treat water for human use.) |
| **Max. Potential for reducing demand** | **Guadalajara – de un 34% a un 15% (**30,698,193 m3)  **León – de un 32% a un 15% (**18,606,240 m3) | **Guadalajara**: 21,128,973 m3  **León**: 9,751,820 m3 | **Guadalajara**: a) potential to reduce industrial demand:  9,682,115 m3  b) Agricultural use, potential to reduce over-exploitation of aquifers:100,643,275 m3  **León**: a) 4,270,357 m3  b) 63,159,289 m3 | **Guadalajara**: 33,000,000 m3  **León**: 14,000,000 m3  (Due to the pollutants present in storm water, it is recommended only for use in toilets. Studies mention that this use uses about 18% of the total) |

## Second period 2024-2029 (3 of 3)

Third decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Limit agricultural growth** | **Limit urban growth** | **Without limits** | **Modernize irrigation to save water for urban use** |
| ../Images/los-limites-del-crecimiento.jpg | ../Images/limites%20al%20crecimiento%20urbano.jpg | ../Images/crecimiento%20ilimitado.png | ../Images/agriculture%20groundwater%20rights.jpg |
| What is it about? | Develop a public policy that discourages economic growth in Los Altos to curb the over-exploitation of aquifers in the region | Develop a public policy to discourage the growth of cities through higher taxes on real estate permits | The model continues to take the current population and economic growth rates in Guadalajara, León and Los Altos. | Develop a public policy that links urban water with agricultural water, where cities assume a payment for lost agricultural production.  Proposal = 0.15 USD per m3 of water destined to modernize irrigation infrastructure |
| **Influence over the system** | Reduces over-exploitation of aquifers | The future demand of cities decreases | Future demand increases in all three regions | This would reduce the over-exploitation of aquifers in Guadalajara and León, but at the cost of increasing the cost of urban water |

## Third and fourth periods 2029-2034 y 2034-2042 (1 of 3)

First decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Reducing physical losses from current yearly rate 0.23% - Gdl, y 0.9% - León to a 5% yearly** | **Rainwater harvesting** | **Water reclamation** | **Stormwater harvesting** |
| ../Images/Fixing%20pipes.jpg | ../Images/Cosecha%20de%20agua%20de%20lluvia.jpeg | ../Images/Agua%20reciclada.jpg | ../Images/Captura%20de%20agua%20de%20tormenta.png |
| **Cost per million cubic meters per year** | **Guadalajara**: 15 million USD  **León**: 3 million USD  (The cost of repairing pipes in Guadalajara is almost 6 times higher than in León) | **Guadalajara**: 15 million USD/Mm3  **León**: 22 million USD/Mm3 | **León**: 157,000 USD/Mm3  **Guadalajara**: 79,000 USD/Mm3 (Agua Prieta y El ahogado) | **Guadalajara**: 4.5 million USD/Mm3  **León**: 4.5 million USD/Mm3  (The cost may increase due to the need to treat water for human use.) |
| **Maximum potential to take advantage of m3 per year** | **Guadalajara – de un 34% a un 15% (**30,698,193 m3)  **León – de un 32% a un 15% (**18,606,240 m3) | **Guadalajara**: 21,128,973 m3  **León**: 9,751,820 m3 | **Guadalajara**: a) potential to reduce industrial demand:  9,682,115 m3  b) Agricultural use, potential to reduce over-exploitation of aquifers:100,643,275 m3  **León**: a) 4,270,357 m3  b) 63,159,289 m3 | **Guadalajara**: 33,000,000 m3  **León**: 14,000,000 m3  (Due to the pollutants present in storm water, it is recommended only for use in toilets. Studies mention that this use uses about 18% of the total) |
| **Influence over the system** | Increase in water supply, increase in collection for SAPAL and SIAPA, and decrease in aquifer recharge due to reduced urban leaks | Reduction of runoff and flooding in cities | Reduction of water demand | Reduction of floods and recovery of urban rivers and public places with the presence of bodies of water. |

## Third and fourth periods 2029-2034 y 2034-2042 (2 of 3)

Second Decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Increasing water price 5% yearly** | **Increasing water price 15% yearly** | **Increasing water price 10% yearly** | **Implement water saving devices** |
| ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.13.04.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.08.31.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-04%2013.31.11.png | ../../../../../Screenshots/Captura%20de%20pantalla%202018-12-05%2012.05.51.png |
| What is it about? | The information will depend on the decisions made in the previous period. | The information will depend on the decisions made in the previous period. | The information will depend on the decisions made in the previous period. | **Potential Savings:**  20% of the total demand that reaches the houses**.**  **What does it consist of?**  Economically encourage water users to implement water saving devices for homes, and prohibit the sale of new equipment that does not have water saving technology |

## Third and fourth periods 2029-2034 y 2034-2042 (3 of 3)

Third decision

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Limit agricultural growth** | **Limit urban growth** | **Without limits** | **Modernize irrigation to save water for urban use** |
| ../Images/los-limites-del-crecimiento.jpg | ../Images/limites%20al%20crecimiento%20urbano.jpg | ../Images/crecimiento%20ilimitado.png | ../Images/agriculture%20groundwater%20rights.jpg |
| **What does it consist of?** | Develop a public policy that discourages economic growth in Los Altos to curb the over-exploitation of aquifers in the region | Develop a public policy to discourage the growth of cities through higher taxes on real estate permits | The model continues to take the current population and economic growth rates in Guadalajara, León and Los Altos. | Develop a public policy that links urban water with agricultural water, where cities assume a payment for lost agricultural production.  Proposal = 0.15 USD per m3 of water destined to modernize irrigation infrastructure |
| **Influence over the system** | Reduces over-exploitation of aquifers | The future demand of cities decreases | Future demand increases in all three regions | This would reduce the over-exploitation of aquifers in Guadalajara and León, but at the cost of increasing the cost of urban water |

1. ,2,3 These options imply not extracting groundwater. [↑](#footnote-ref-1)